BUREAU OF WATER QUALITY
PROGRAM GUIDANCE

Wastewater Policy and Management Team

Development and Implementation of Water Quality Standards Variances

Wisconsin Department of Natural Resources

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This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

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Summary

Wastewater discharges to surface water covered under Wisconsin Pollution Discharge Elimination System (WPDES) permits may be subject to water quality-based effluent limits (WQBELs). Under certain circumstances, these WQBELs may not be attainable within the five-year permit term. According to ss. 283.15 and 283.16, Wis. Stats., the department may include a water quality standards (WQS) variance in WPDES permits to provide dischargers additional time to meet the limit, during which incremental progress is made towards meeting the WQBEL.

Section 283.15, Wis. Stats., establishes a process and requirements for adopting individual variances to water quality standards. Section 283.16, Wis. Stats., authorizes the state to establish a statewide multi-discharger variance for phosphorus, and establishes the procedures for completing the variance process. Chapter NR 106, Wis. Adm. Code, contains procedures for calculating WQBELs for toxic and organoleptic substances and subchapter III "Effluent Limitations for Mercury Discharges" and Subchapter VII "Effluent Limitations for Chloride Discharges" include variance-related conditions. Chapter NR 200, Wis. Adm. Code, establishes procedures and requirements for permit and variance applications.

Requests for a WQS variance are typically made at the time of WPDES permit application but may not be made later than the close of the public comment period of a draft permit based on federal regulations, 40 CFR ss. 122.21(m)(5) and (n)(3) and 40 CFR 124.10. Permittee-specific information must be submitted in variance applications depending on the type of pollutant(s) for which the permittee is requesting a WQS variance. This information generally includes:

- Effluent and receiving water location and flow.
- A description of existing treatment technologies.
- Current effluent concentrations of the pollutant.
- Information supporting the justification of need for the variance (typically documentation that installing treatment would cause substantial and widespread adverse social and economic impacts in the area).
- A summary of pollutant source reduction measures taken to date, and
- A pollutant minimization plan outlining proposed future source reduction actions to be taken while the variance is in place.

DNR staff review all variance application materials in order to determine whether the justification of need and highest attainable condition requirements are met and, if so, public notices the draft permit with the proposed variance conditions. A public informational hearing is conducted after a 45-day public notice is posted on the DNR website and in the local newspaper and variance related documents are made available online for the public to review and provide comment. The deadline for written comments is specified in the public notice (typically set at 7 days after the hearing date).

Once the public participation period has ended, DNR staff will review and respond to comments received. DNR then makes a final decision to approve or deny the variance. If approved, DNR sends the final variance submittal to EPA for their review and approval prior to incorporating it into a reissued WPDES permit. If denied, DNR makes a statement in the notice of final determination that the variance

request was denied and sends the final denial letter to the permittee with the reissued permit. A notice of the final decision (approval or denial) on the variance is posted on the DNR website for a minimum of 30-days and all interested parties are sent a copy of the final decision documents.

The purpose of this document is to explain in more detail the process of variance development and the steps a permittee may take to implement variance provisions once they are incorporated into a reissued WPDES permit. Much of the information provided in this document is based on the Department's experience over the last 20+ years in working with EPA and permittees to produce approvable variances that result in measurable improvements in water quality. The guidance in this document may be updated as the Department continues to gain more experience with the implementation of WQS variances in WPDES permits and replaces the "DNR's Recommendations for SRMs and PMPs for Arsenic, Chloride, Copper, and Mercury Variances" document dated July 25, 2014.

This document is primarily intended to provide guidance related to procedures in s. 283.15, Wis. Stats., and only contains a limited discussion of the statewide phosphorus variance requirements in s. 283.16, Wis. Stats. For more information about the phosphorus multi-discharger variance visit https://dnr.wi.gov/topic/wastewater/phosphorus/statewidevariance.html.

Variance questions that are not addressed by this document can be directed to DNR staff assigned to work on a particular WPDES permit (https://dnr.wisconsin.gov/topic/Wastewater/PermitsStaff.html). Any remaining unanswered questions can be directed to local wastewater staff or to the contact listed at: https://dnr.wisconsin.gov/topic/Wastewater/variances.html.

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Abbreviations and Acronyms

This list contains the most common abbreviations used in this document.

AM	Adaptive Management
BMP	Best Management Practice
DMR	Discharge Monitoring Report
DNR	Wisconsin Department of Natural Resources
EPA	United States Environmental Protection Agency
HAC	Highest Attainable Condition
HUC	Hydrologic Unit Code
I/I	Inflow and Infiltration
MDV	Multi-Discharger Variance
MGD	Million Gallons per Day
mg/L	Milligrams per Liter
MHI	Median Household Income
MS4	Municipal Separate Storm Sewer System
ng/L	Nanograms per Liter
O&M	Operation and Maintenance
P_{99}	99^{th} percentile of the dataset calculated according to s. NR 106.05(5), Wis. Adm. Code.
PMP	Pollutant Minimization Program
POTW	Publicly Owned Treatment Works
Qe	Effluent Flow
SWAMP	System for Wastewater Applications, Monitoring and Permits
SRM	Source Reduction Measure
TBEL	Technology-Based Effluent Limit
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
µg/L	Microgram per Liter
WPDES	Wisconsin Pollutant Discharge Elimination System
WQBEL	Water Quality-Based Effluent Limit
WQS	Water Quality Standards
WQT	Water Quality Trading
WWTF	Wastewater Treatment Facility

Chapter 1 – Water Quality Standards Variance Overview

As Wisconsin's delegated entity for administering the federal Clean Water Act National Pollutant Discharge Elimination System Program, the Wisconsin Department of Natural Resources (DNR) has considerable experience processing variance applications to facilitate permit issuance for WPDES permittees. To ensure statewide consistency in developing and implementing variances in permits, variance review and approvals are coordinated though a standardized process that involves multiple DNR staff, as well as staff from the US. Environmental Protection Agency (EPA). Chapter 1 of this guidance describes water quality standards variances, hereafter referred to simply as "variances", and provides context for the applicable legal requirements found in state statutes and administrative code.

Variances are a useful regulatory approach that can help address situations where it is infeasible for facilities to immediately comply with newly adopted WQS, or a newly imposed water quality based effluent limit that is included in a permit. If an individual discharger is unable to comply with a new water quality based effluent limitation based on one of the six justifications listed in s. 283.15(4)(a), Wis. Stats., a variance to the WQS offers a site-specific framework that can document current effluent quality and limitations, consider public input, and require incremental progress towards meeting the standard.

This document pertains to discharger-specific variances and does not discuss water body or water body segment-specific variances. (See 40 CFR 131.14 for more information related to those variance types.) A general discussion of water quality standards is provided in Section 1.01. Section 1.02 provides a discussion of the basic concepts that apply to variances. Section 1.03 provides a discussion of the different parties involved in the variance process and their respective roles.

Additional information may be found at the DNR water quality standards variance webpage: https://dnr.wi.gov/topic/wastewater/variances.html.

Section 1.01: Introduction to Water Quality Standards (WQS)

Water quality standards identify the designated uses and criteria for surface waters of the State. These conditions are often described in physical, chemical, or biological terms for a given type of surface water. The process by which standards are identified, adopted, and implemented is a cornerstone of the Clean Water Act. States that administer the Clean Water Act are tasked with setting designated uses for water bodies which determine the types of activities the water should support (i.e., public health and welfare, recreation, aquatic life, and wildlife). Criteria are then developed to ensure a water body (or group of water bodies) attains a given use. Criteria may be expressed in the following two ways:

Narrative Criteria

Narrative criteria are a qualitative description of water body conditions that must be attained to support the designated uses. These describe water quality conditions that are or are not acceptable, and may include the physical condition of a waterbody, such as a prohibition of scum or debris.

Numeric Criteria

When a specific pollutant can be quantified in terms of mass or concentration, a numeric criterion may be used to define an acceptable level for the pollutant in a surface water. The criterion would reflect the threshold level of pollutant above which a designated use may not be supported. Minimum thresholds may also apply, such as temperature or dissolved oxygen criteria. More information related to numeric criteria can be found in the "Procedures for Deriving Wisconsin's Numeric Surface Water Quality Criteria".

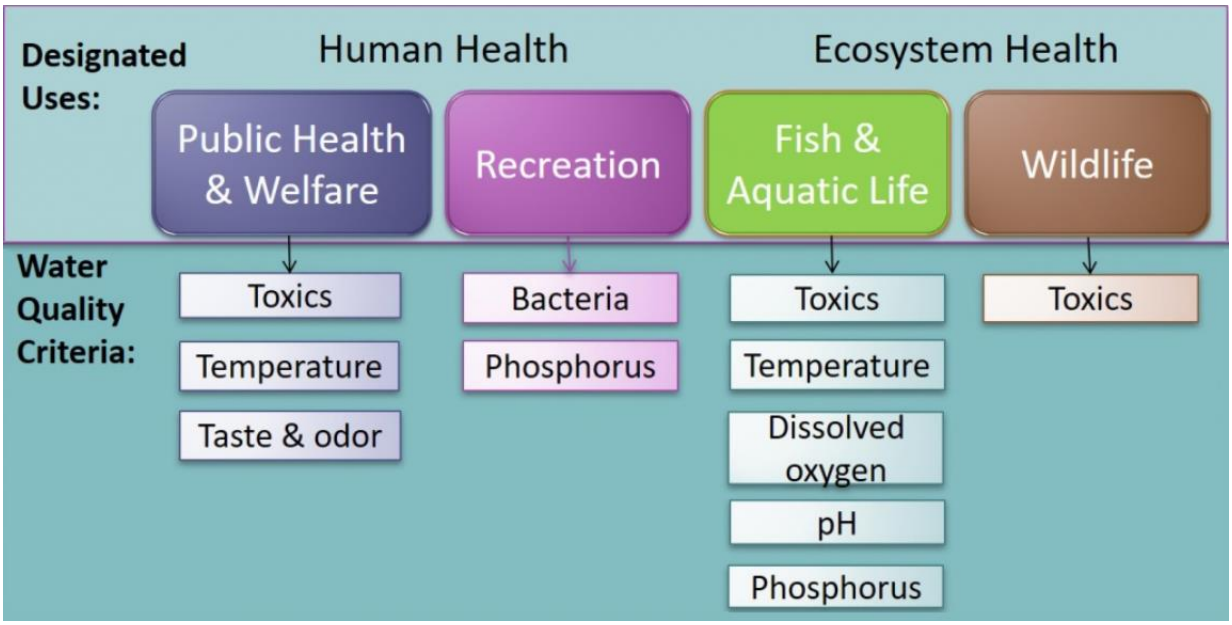


Figure 1. Designated Use Types and Associated Criteria

While standards may be developed for groundwater, variances under Wis. Stat. ss. 283.15 and 283.16 do not apply to groundwater standards. This guidance focuses solely on surface water standards and variances as they are applied to wastewater discharges to surface waters. For more information on groundwater quality, see: https://dnr.wi.gov/topic/Groundwater/GWLaw.html.

Section 1.02: Introduction to Variances

The term "variance" can sometimes be misleading since some other regulatory programs use the term to describe completely exempting an entity from a rule requirement. This is not the case for WQS variances in the WPDES program. WQS variances are a regulatory structure that allows permittees to make incremental progress in pollutant reductions with the goal of a achieving a water quality based effluent limit (and WQS) that is not currently achievable. It gives permittees time to systematically problem-solve on ways to reduce the pollutant of concern that is not achieving the WQS and work towards attaining WQS within a practical and economically feasible timeframe. When used in this document, the term "variance" refers to WQS variances under Wis. Stat. s. 283.15 and 283.16.

In order for a variance to be approvable by DNR and EPA, the permittee will need to submit sufficient justification and supporting documentation for review. Building a variance justification often involves

submittal and review of compliance cost estimates, facility information, and economic information for the area in which the discharge is located. This process is described in more detail in chapter 2. The variance must also identify the waterbody's or facility's highest attainable condition during the variance term (40 CFR 131.14(b)(1)(ii)). Implementation of variances is described in greater detail in chapter 3.

Highest Attainable Condition (HAC)

HAC is the greatest pollutant reduction achievable or the best environmental outcome achievable. HAC can be determined by evaluating the sources of the variance pollutant to the waterbody or facility, identifying all potential options to reduce those sources, and evaluating the feasibility of each of the identified options.

40 CFR 131.14(b)., lists the requirements for a variance submission to EPA. Specifically, a WQS variance submittal must describe the requirements that apply throughout the term of the variance. The requirements must represent the HAC of the water body or waterbody segment and shall not result in any lowering of current water quality. The state must specify the HAC of the water body or waterbody segment as a quantifiable expression that is one of the following types (40 CFR 131.14(b)ii(A)(1)–(3):

> ***(Type 1)*** The highest attainable interim criterion; or
> *****Type 1 HAC is not applicable in Wisconsin as it is not supported by current Wisconsin statutes or administrative codes.*****
>
> ***(Type 2)*** The interim effluent condition that reflects the greatest pollutant reduction achievable; or
>
> ***(Type 3)*** If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the variance, and the adoption and implementation of a Pollutant Minimization Program.

HAC Permit Implementation – Type 2 vs. Type 3

Type 2 – Requires installation of feasible pollutant control technology to reduce effluent concentrations below the level currently achievable but not enough to meet the final WQBEL. Includes an interim limit and (depending on timing of technology installation) requirements to implement a pollutant minimization program plan/source reduction measures plan.

Type 3 - implemented in a WPDES permit through the inclusion of an interim limit set to a level currently achievable along with requirements to implement a pollutant minimization program plan/source reduction measures plan.

Individual Variance

Most variances issued by DNR are individual variances—variances issued to single facilities. To date, DNR has issued individual variances for arsenic, chloride, copper, zinc, mercury, and phosphorus to many different permittees. Each individual variance has a customized, site-specific pollutant reduction plan and goals. However, a multiple discharger variance (MDV) may be developed in cases where multiple facilities can be grouped into categories with similar characteristics and requirements. To date, DNR has only approved an MDV for phosphorus which is allowed pursuant to Wis. Stat. s. 283.16.

Multiple Discharger Variances

An MDV provides for administrative streamlining and maximizes the potential benefits (e.g., watershed projects) that a multi-facility framework may obtain through a variance program. For example, the DNR and EPA approved an MDV for phosphorus in 2017. For eligible facilities, the MDV extends the timeline for complying with low-level phosphorus limits. In exchange, point sources commit to step-wise reductions of phosphorus within their effluent as well as helping to reducing phosphorus from agricultural sources by implementing projects or contributing money toward projects that are designed to improve water quality. Wisconsin's phosphorus MDV received federal approval for a 10-year implementation period. While the approval may be renewed, the MDV is still considered a temporary option to address phosphorus WQBELs.

The general concept and requirements of an MDV are the same as an individual variance, but the MDV "bundles" or streamlines the administrative process. The guidance in this document applies only to individual variances. For more information about the phosphorus MDV visit: https://dnr.wi.gov/topic/wastewater/phosphorus/statewidevariance.html.

Section 1.03: Roles

Several parties are involved in the development and implementation of individual water quality standards variances. Historically, the majority of individual variances have been for municipal permittees and the language used throughout this document tends to be municipality focused (i.e., community), however the information still generally applies to industrial facilities.

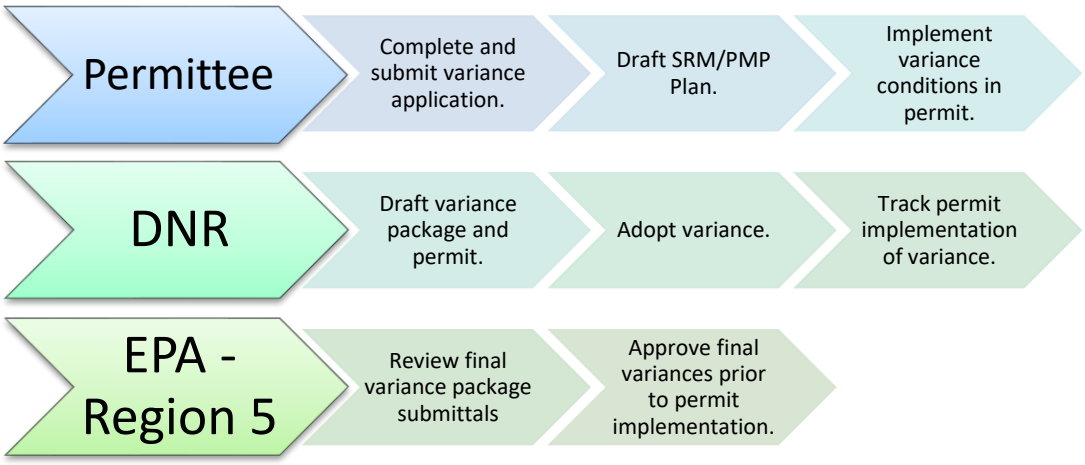


Figure 2. Roles of Parties Involved in Variances

Permittee Roles

The variance process is centered around facility-specific conditions that dictate the need for a variance. Permittees have a number of responsibilities during each step of the process. Many steps will involve communication within the community and with consultants that the permittee may hire to help with the process. Communication with DNR is also necessary to ensure a smooth variance approval and permit issuance process. While DNR staff can help to explain the regulations applicable to a given facility, it is

the permittee's responsibility to gather information and plan actions for compliance purposes and integrate these into the overall vision for the facility and its partners.

Identifying the need for a variance (as described in Section 2.01) is the first step in the variance process. It is important for the permittee to understand which limits may be applicable to the facility, the timeframe in which limits become effective, and the ability of the treatment process to comply with limits. If a permittee has reason to believe that they will be subject to WQBELs that they cannot achieve compliance with, early planning and discussions around the timely submittal of a variance application is paramount.

Throughout the variance development phase, the permittee will need to provide technical and economic information to justify the need for the variance (as described in Section 2.02). The permittee may need to gather information from the municipality, from a consulting firm, census data, or from past facility permit records. Depending on staff resources, permittees may need to hire consultants to participate in the variance process on their behalf. While involving a consulting firm is not required, the ability to provide technical information with regards to treatment capabilities may be needed.

Variance implementation occurs throughout the permit term for which the variance is approved. During variance implementation (as described in Section 3.01) it is the permittee's responsibility to take all actions outlined in the permit and any associated pollutant minimization program (PMP). SRM/PMP plan development is described in Chapter 4. Permittees should document efforts and outcomes of the SRM/PMP. By highlighting successes and failures, the permittee makes a demonstration that progress is being made, problems are being identified and solved, and the permittee is working within its means to reduce pollution on the road to final compliance.

DNR Roles

DNR staff coordinate the variance application process and ensure that variance requirements are met throughout the permit term. Different staff within the DNR wastewater program have a unique role for contribution to the variance process:

WQBEL Calculator

During the permit issuance process, the WQBEL calculator prepares a WQBEL memo which includes the limits needed to ensure WQS are met in the receiving water. The WQBEL memo contains the necessary final permit limits based on effluent and receiving water information available at the time to ensure WQS are maintained and protected. If the permittee applied for a variance with the permit application, the WQBEL calculator will also determine the effluent concentration which represents the level currently achievable and/or HAC. One or both of these effluent concentrations may be included in the reissued permit as an interim limit if the variance is approved. The WQBEL calculator is generally not involved in the variance process beyond providing limits applicable to the given discharge and provide information for certain sections of the EPA datasheet.

Permit Drafter

The permit drafter manages receipt of the permit application and variance application. Permit drafters may also be involved in interpreting information for the EPA datasheet and discussing permit provisions with DNR and EPA staff. Ultimately, the permit drafter is responsible for preparing the variance package submittal, transmitting the variance and permit information to EPA, coordinating the informational hearing, and associated public notice, responding to any comments on the variance, and incorporating variance requirements into the reissued permit.

Compliance Staff

Compliance staff work more closely with and have more site-specific knowledge of the effluent discharge and WWTF than other DNR staff. They communicate directly with the permittee to obtain required information. Technical knowledge of the treatment process may help define treatment capabilities and what upgrades might be needed to comply with the limit. This information will most commonly be applied during the review and approval of cost estimates and facility plans that support the variance justification. Justification determinations are generally made through the pollutant expert or Statewide Variance Coordinator.

Pollutant Expert

Variance submittals for a given pollutant will typically contain similar justification elements. In general, treatment technologies to meet a given limit will be applicable across multiple facilities. Pollutant experts should stay informed of treatment technologies, their general costs and limitations, and the status of the pollutant in surface water in general. For a given variance, the pollutant expert will review the justification and Source Reduction Measure (SRM) or PMP, if applicable.

EPA Roles

Since a variance is a temporary change to a WQS, all state proposed variances must be approved by EPA before being included in a WPDES permit. EPA reviews all variance materials on an individual basis and has 60-days to approve (or 90 days to disapprove) changes to a WQS, including variances (s. 40 CFR Part 131.21).

DNR coordinates closely with EPA Region 5 staff that have oversight over WQS programs in Minnesota, Wisconsin, Michigan, Illinois, Indiana, and Ohio. When a new WQS is applied or the need for a new type of variance arises, DNR works with EPA to establish expectations for variance submittals. Coordinated activities also include workload planning and interpretation of new federal requirements.

Chapter 2 – Variance Process

There are many steps involved in the variance process, beginning with the permittee submitting an application, to obtaining EPA approval, and ultimately incorporating the variance into a reissued permit for implementation. The figure below lists variance steps for an approvable variance.

1. •Permittee submits variance application with permit application for reissuance.
2. •DNR reviews variance application.
3. •DNR requests additional information & documentation from permittee to justify need and establish HAC, **if needed.**
4. •DNR drafts permit and variance package, completes internal review.
5. •DNR sends pre-public notice package to EPA & draft permit package to permittee for initial review.
6. •EPA completes initial review of pre-public notice submittal.
7. •DNR requests additional information from permittee, makes updates to package, **if needed**.
8. •DNR sends permit & variance to EPA and public notice (45-day notice of hearing required).
9. •Permittee, public, and EPA submit public comments no later than 7 days after hearing date.
10. •DNR addresses comments, updates permit and/or variance package, **if needed**.
11. •DNR makes final decision on variance, State adopts the variance and sends final variance to EPA for approval.
12. •EPA reviews final variance submittal and approves variance.
13. •DNR reissues permit with approved variance conditions.
14. •Permittee implements SRM/PMP actions and follows permit conditions in reissued permit.

Figure 3. Overall Variance Process

Section 2.01: Identifying the Need for a Variance

WQBELs and Standards

A WQBEL is the pollutant level that must be met in an effluent to ensure the discharge is not causing or contributing to an exceedance of water quality standards. The WQBEL is usually based on a mass-balance calculation between the effluent and the receiving water. Pursuant to s. 283.13(5), Wis. Stats., a WQBEL must be included in a permit for a pollutant whenever a discharge has reasonable potential to contribute to or exceed a WQS. Section 283.31(3)(d) also requires, whenever applicable, more stringent limitations be included when necessary to meet water quality standards. Procedures for determining reasonable potential can be found in ss. NR 106.05, 106.33, 106.56, and 217.15, Wis. Adm. Code. More information related to WQBELs and reasonable potential can be found in the "Calculating Water Quality-Based Effluent Limitations for Surface Water Discharges" guidance.

Once the WQBEL calculator has determined that a discharge has shown reasonable potential and needs a WQBEL, they check to see whether it is likely that the discharger will be able to meet the WQBEL or whether more significant actions will be needed to come into compliance. This analysis is typically made by comparing the WQBEL to data from discharge monitoring reports (DMRs) or information submitted with the permit application.

In most cases, permittees are already aware that a variance may be needed and will submit a variance application with the permit application for reissuance. However, in some cases, WQBEL staff may determine that a variance is needed after the application is submitted. When this happens, WQBEL staff should communicate this to the permit drafter immediately so that a variance application can be requested from the permittee and the variance process can be initiated with the Statewide Variance Coordinator, whose contact information can be found on the variances to water quality standards webpage.

When it has been decided that a variance is needed, the WQBEL calculator should calculate an interim limit to be included in the proposed permit. This limit should be set at a concentration that the discharge is already meeting and that is low enough to prevent backsliding. Interim limits are discussed further in Section 3.02.

WQBELs and Variances

WQBELs are set to ensure that water quality standards are met and serve as a measurable and enforceable means by which wastewater discharges can be shown to comply with standards. WQBELs in reissued permits must either be effective immediately upon issuance, become effective after a permit-required compliance schedule, or be addressed with a variance for the subject pollutant(s). When a variance is granted, the variance serves as a temporary change to the WQS, and any interim effluent limitations and conditions applicable to the discharge will reflect the highest attainable condition for the surface water. The revised WQS considers feasible pollution control technology at the facility, coupled with any SRM plan or PMP actions to attain the highest attainable condition, as required by federal code (40 CFR 131.14(b)(1)(ii)).

Instances in Which Variances Are Not Authorized

A new discharger is not eligible for a variance pursuant to s. 283.15(2)(a) Wis. Stats. All new dischargers are expected to meet water quality standards upon commencing discharge (or shortly thereafter once treatment is fully on-line).

Variances are applicable only to WQBELs; a discharger may not receive a variance from a technology-based effluent limit (TBEL), pursuant to Wis. Stat. s. 283.15. TBELs are not derived from water quality standards, but rather are set based on readily available technology that has been demonstrated to achieve a certain level of pollutant reduction for a category or class of dischargers. Should a TBEL not be achievable, alternative effluent limitation (AELs) may be authorized depending on the pollutant and specifics of the treatment process (TBELs for industrial dischargers are described in more detail in chs. 220-299, Wis. Adm. Code, AELs are discussed in subchapter IV of NR 220, Wis. Adm. Code. Department staff can find more about TBELs here.

Variance procedures described in s. 283.15, Wis. Stats., do not apply to the issuance, reissuance, or modification of permits to incorporate toxic effluent standards or prohibitions promulgated by rule under s. 283.11 (4) or 283.21, Wis. Stats.

A variance may not be allowed if the requirements of the variance result in any lowering of the currently attained ambient water quality. This is based on the federal regulation in 40 CFR 131.14(b)(1)(ii) and Wis. Stat. s. 283.15(12). This means that interim limits cannot be higher than existing effluent quality. This federal and state limitation is also relevant in other circumstances. For example, if a facility (with past representative data) discharged a pollutant at concentrations where a WQBEL for the pollutant was not necessary (based on reasonable potential procedures) but a change occurs resulting in an increase in the concentration of the pollutant in the discharge at levels that require a limitation (using reasonable potential procedures), the permitted facility may not be approved for a variance to the newly imposed WQBEL unless the facility demonstrates that the increased effluent concentrations do not result in a lowering of the currently attained ambient water quality, consistent with 40 CFR 131.14(b)(1) (ii). Whether a variance may be approved depends on the reasons for the increase in the pollutant discharged and the overall effect on the relevant waterbody. Staff should work closely with the variance coordinator and USEPA to determine whether a variance is approvable. When evaluating the restriction in 40 CFR 131.14(b)(1)(ii), the following reasons for the effluent quality change may be considered:

- Anticipated effect on the receiving water.
- Anticipated change to the effluent concentration.
- Anticipated change to the effluent load.
- Source of the additional pollutant concentration or load.
- Location of the pollutant loading prior to the change.
- Any changes to the operations or management of the facility.

Other situations in which a variance may not be granted:

- Failure to implement the SRMs established as conditions in the permit that include the previous permit's variance (this constitutes a permit violation subject to enforcement).
- Whenever the variance application fails to show sufficient need (justification).
- Whenever effluent data indicates that the WQBEL is both necessary and can consistently be met, the permit should include the WQBEL and if needed, an appropriate compliance schedule.
- Whenever the permittee and the Department cannot agree upon an interim limit and SRMs/PMPs.

Section 2.02: Variance Application and Supporting Documents

In most cases, a variance will be requested at the time of application for permit reissuance. The DNR recommends that WQS variance requests be submitted at the time of WPDES permit application pursuant to Wis. Stat. s. 283.15(2)(a) to ensure timely permit reissuance. When a variance was included in a previously effective permit, or it is expected that a variance will be necessary in the next permit term, a variance application should be submitted with the permit application. For expiring permits, the permit application and variance application are due 180 days prior to the expiration date of the permit.

Note: Under federal regulations, an application for a variance may not be made later than the close of the public comment period of a draft permit based on federal regulations, 40 CFR ss. 122.21(m)(5) and (n)(3) and 40 CFR 124.10. Wis. Stat. s. 283.15(2)(am) does allow a variance application to be submitted within 60 days after the permit is reissued, but a submittal made after the close of the comment period does not comply with federal regulations. EPA must approve all variances and Wis. Stat. s. 283.15(12) references compliance with federal regulations, so DNR recommend that variance applicants submit the application consistent with Wis. Stat. s. 283.15(2)(a) and federal regulations. The DNR has requested that sub. (2)(am) be removed.

Variance applications are pollutant specific and are available as follows:

Table 1. Links to Variance Application Forms and Worksheets

Name of Form	Link
Chloride Variance Application - Form 3400-193	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=189245448
Copper Variance Application Form for Municipal Permittees	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=282206127
Mercury Variance Application - Form 3400-192	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=189245457
Attachment to Variance Application for Mercury for Industrial & Similar Facilities	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=282206329
Phosphorus Variance Application for Industrial - Form 3200-144	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=85310795
Phosphorus Variance Application for Municipal - Form 3200-143	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=85310480

Attachment to Variance Application for Municipal Facilities	https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=282206207

Arsenic and Zinc

Due to the rarity of arsenic and zinc variances, there is no specific application form for these pollutants. The absence of a form does not mean a facility cannot apply for a variance. Facilities wishing to apply for an Arsenic or Zinc variance should reach out to their local DNR wastewater contact.

Variance Justification

As discussed above, variances may only be approved in certain situations. General eligibility criteria will depend upon which type of variance justification is used. Section 283.15(4)(a) Wis. Stats. contains six possible justifications for approving a variance. Only one needs to be met to satisfy the requirement.

> "1. The secretary shall approve all or part of a requested variance, or modify and approve a requested variance if the permittee demonstrates, by the greater weight of the credible evidence, that attaining the water quality standard is not feasible because:
>
> a. Naturally occurring pollutant concentrations prevent the attainment of the standard;
>
> b. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the standard, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating water conservation requirements;
>
> c. Human caused conditions or sources of pollution prevent the attainment of the standard and cannot be remedied or would cause more environmental damage to correct than to leave in place;
>
> d. Dams, diversions or other types of hydrologic modifications preclude the attainment of the standard, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the standard;
>
> e. Physical conditions related to the natural features of the water body, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
>
> f. The standard, as applied to the permittee, will cause substantial and widespread adverse social and economic impacts in the area where the permittee is located."

While there are six factors listed in statute, the majority of variances for Wisconsin facilities have fallen under category "f", otherwise known as factor 6, or an economic variance. However, there are a few facilities that have approved variances that fall under category "c", or factor 3. **If a facility believes that a category "c" (factor 3) justification may be appropriate, they should reach out to their regional DNR staff along with the Statewide Variance Coordinator as soon as possible.** Further discussion on category "f" (factor 6) variances is provided below.

Variance Justification pursuant to s. 283.15(4)(a)(1)(f), Wis. Stats.

Of those permittees investigating the need for a variance, most will be doing so in light of the economic consequences of a given WQBEL. Municipalities or industries may be unable to install required pollutant removal equipment at the facility due to economic constraints. These limitations will be reflected in item (f) of the above statutes. Information must be provided to demonstrate that costs for complying with the WQBEL result in substantial and widespread adverse social and economic impacts. Given that impacts must be widespread, a geographic area over which compliance costs are distributed should be defined. In most cases, a local municipal boundary is an appropriate scale at which to evaluate impacts. Larger geographic scales, such as a county-wide or regional analysis, are more appropriate for multi-discharger variances and may not be appropriate for individual variances.

EPA has prepared a guidance document titled *Interim Economic Guidance for Water Quality Standards*, which the department encourages permittees to review to assist them in justifying the need for a variance under s. 283.15(4)(f), Wis. Stats. Visit the EPA website for additional information on this EPA guidance document.

EPA Website:
https://www.epa.gov/wqs-tech/economic-guidance-water-quality-standards

Interim Economic Guidance for Water Quality Standards:
https://www.epa.gov/wqs-tech/economic-guidance-water-quality-standards

According to the EPA guidance, a municipality applying for a variance typically needs to demonstrate that the treatment alternatives required to treat for the pollutant in question would raise the sewer user rates of a municipality to greater than 2% of the Median Household Income (MHI). This "2% threshold" referenced within the EPA guidance is not explicitly listed in either state or federal code within the sections directly related to variances. However, besides being within EPA's guidance, the 2% threshold is also what WDNR uses when establishing financial hardship within the Clean Water Fund Loan Program (s. NR 162.24(1)(b), Wis. Adm. Code and s. 281.58(13)(b)2., Wis. Stats.) Therefore, to be consistent between programs, the "2% threshold" is generally used to demonstrate substantial and widespread economic impacts for a variance as well. According to EPA guidance, it could then be concluded that the community would experience substantial and widespread adverse social and economic impacts, which would satisfy the justification requirement for a variance under s. 283.15(4)(f), Wis. Stats. Economic information, including MHI, is published by the U.S. Census Bureau. DNR's Environmental Loans program tabulates MHI values generated by the American Communities Survey (ACS) for every community in Wisconsin. Permittees seeking economic information for their community should use the most recent ACS values provided by the environmental loans program available at the time in which the variance application is submitted. Updated ACS MHI data is typically available sometime in September or October and can be found on the Environmental Loans Program website: https://dnr.wisconsin.gov/topic/aid/dataSources.html. When viewing the information on the website, there will be three pdf documents listed and the most recent list of MHI data available will be the first pdf listed. Information obtained from non-ACS sources, including third party surveys, will not be accepted.

Compliance costs submitted as part of an economic justification under s. 283.15(4)(f), Wis. Stats. will be reviewed by DNR to ensure the calculations accurately represent real-world conditions. The following points are key considerations made when DNR reviews compliance cost information:

1. The permittee should provide a site-specific, itemized cost estimate for compliance with the WQBEL. Poorly documented or unrealistic compliance costs will not be accepted.
2. Compliance cost estimates must not include general facility upgrades for ancillary treatment processes not required to meet the WQBEL from which the variance is sought. Pursuant to s. 283.15(4)(a)1.f., Wis. Stats. the variance economic demonstration may only account for "the standard, as applied to the permittee".
3. Compliance cost estimates may include ancillary treatment equipment when the permittee can clearly document that a deficiency in a certain aspect of the treatment train would preclude proper operation of the treatment process designed to treat the variance pollutant. For example, upgraded sludge handling equipment may be a relevant cost when implementing chemical phosphorus removal when the additional sludge production would exceed the capacity of existing equipment.
4. Ancillary treatment equipment already planned for the next variance/permit term may be included if user rates are already set to be impacted by the new construction. If this treatment equipment will be utilizing equipment replacement funds only, these costs may not be included.
5. Costs incurred through collection system maintenance may not be included as compliance costs unless historical inflow and infiltration (I/I) has been documented at levels that would regularly (annually or more frequently) overwhelm a treatment process creating a treatment facility overflow or unscheduled bypass.
6. For municipalities, a cost-effective analysis pursuant s. NR 110.08(6), Wis. Adm. Code, should be completed and contain the items identified in s. NR 110.09(2), Wis. Adm. Code. This will ensure cost appropriate treatment equipment has been selected. Ideally, this would be completed as part of a facilities plan.
7. For municipal entities, annual debt service for compliance costs should be based on annual loan payments on a 20-year Clean Water Fund loan at the interest rate for which the municipality would qualify. These rates change annually and are based on a percentage of the Market Rate and portion of the costs attributable to non-industrial treatment (parallel cost percentage). See https://dnr.wisconsin.gov/aid/EIF.html for more information.
8. For industrial entities, annual debt service for compliance costs should be based on the lowest-cost financing attainable. The loan term should be at least 10 years to keep annual expenses to a minimum.
9. Operation and Maintenance (O&M) costs of any required equipment may also contribute to compliance costs. These costs should be itemized and supported by current costs for each item such as electricity, labor, treatment chemicals, etc. Existing O&M costs are part of existing pollution control costs and should not be included as newly incurred compliance costs.
10. It is inappropriate to deem existing equipment insufficient due to projected future flows that will not occur during the next permit term. When gauging the suitability of existing treatment equipment capacity, conditions associated with the next 5-year permit term should be used.

For chloride and mercury, the department performs an initial screening to determine an individual facility's eligibility. Therefore, a facility may not need to provide all of the economic justification listed above. Instead, only a truncated list of site-specific information may be needed (#1-3 above). However, in certain situations, especially phosphorus, the complete list of economic justification information listed above (#1-10) may be needed.

Once compliance costs have been calculated, results should be used to calculate a primary screener value. EPA's *Interim Economic Guidance for Water Quality Standards* suggests that a primary screening value be used to gauge economic impacts of pollution control costs for a community. For municipalities, the recommended primary screener is household sewer rates, expressed as a percentage of the community's median household income. DNR will review primary screener calculations for accuracy and representativeness. Important guidelines for primary screener calculation include:

- For municipalities, compliance costs will be spread evenly across sewer users within the service area. Typically, an annual average sewer rate should be used in the primary screener calculation.
- If multiple municipal entities are part of the sewer service area, a single flow-weighted average MHI value should be used in the primary screener calculation.
- If unincorporated residential areas are part of a sewer service area, town-level MHI values may be used in the primary screener calculation. Unless the residential area is considered a Census Designated Place (CDP) in which case, the DNR Environmental Loans Section may have MHI data for the CDP.
- When using a household primary screener value, nonresidential compliance costs must be excluded from the primary screener calculation. This includes compliance costs borne by any industries, businesses, and institutions.

Figure 4 provides an overview of the steps used to calculate the residential primary screener value for use at municipal POTWs.

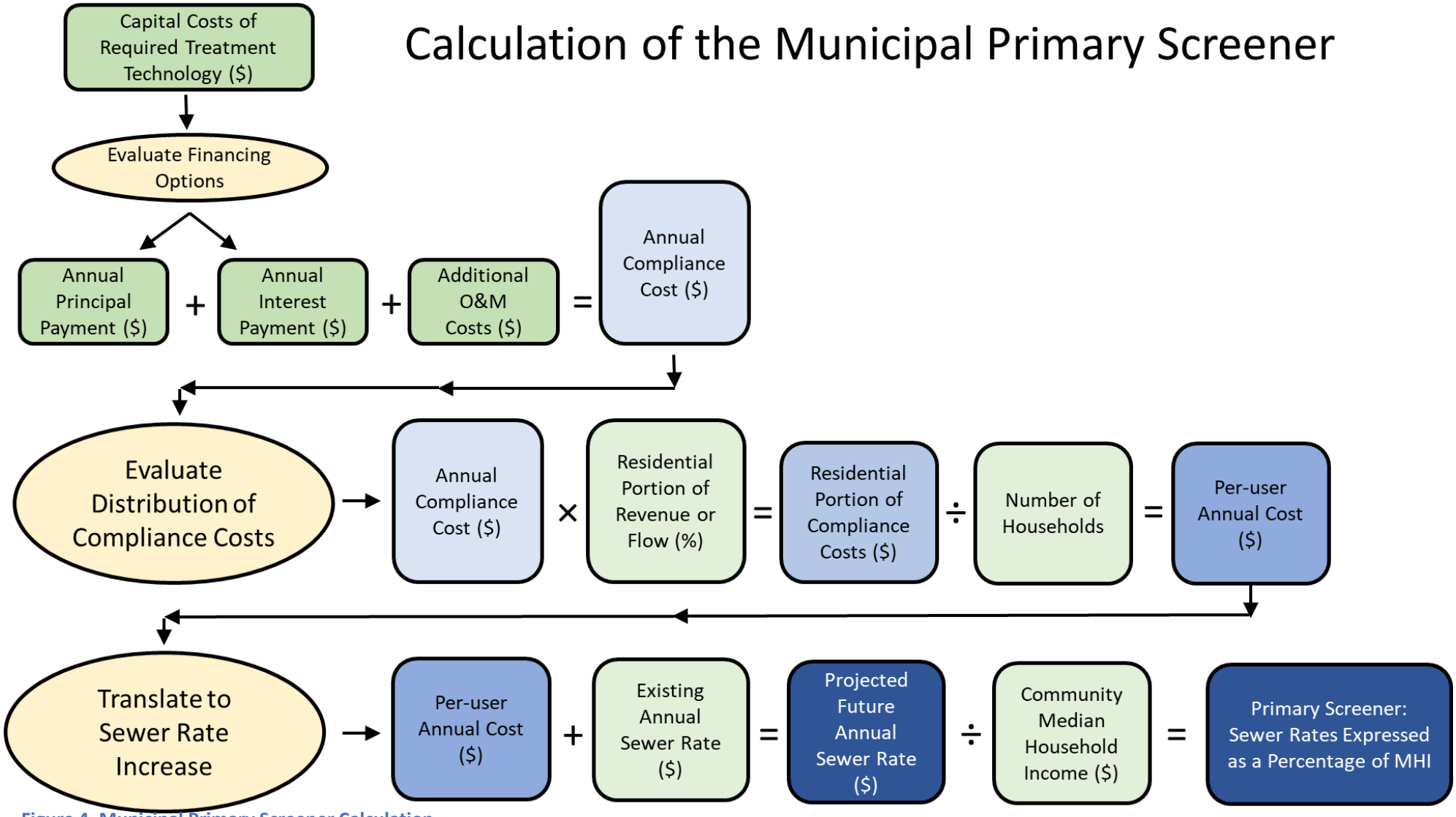


Figure 4. Municipal Primary Screener Calculation

Industrial permittees applying for variances may need to supply additional information such as overall size of the company and the effect the additional cost of treatment will have on the company and the community in which it resides. At the time of this guidance, for mercury variances DNR currently relies on the economic justification presented in the "Assessing the Economic Impacts of the Proposed Ohio EPA Water Rules on the Ohio Economy" document dated April 24, 1997 and prepared by the Ohio EPA.

In some situations, the costs associated with the treatment necessary to meet the final WQBEL may cause widespread economic impact and therefore warrant a variance. However, there may be other, less expensive treatment options that can significantly reduce the pollutant but not meet the WQBEL. For example, a permittee may not be able to afford to add tertiary treatment to meet a stringent phosphorus limit, but they might be able to install biological or chemical phosphorus removal that could get them closer to that final WQBEL.

When there are feasible treatment options that would not result in substantial and widespread adverse social and economic impacts in the area where the permittee is located, that treatment may be required to be installed as part of the variance to meet HAC requirements as outlined on page 3 of this guidance. As noted in the example above, this is most commonly encountered for phosphorus variances, where proven and affordable means of pollutant removal exist and are widely employed in Wisconsin. In these cases, the variance justification may not be complete until a site-specific cost estimate for traditional pollutant removal technology, such as chemical or biological phosphorus removal, is provided. If an upgrade to implement these pollution removal technologies does not result in substantial and widespread adverse social and economic impacts, the upgrade will be required during the variance term.

Choosing between Individual or Multi-discharger Variance

A multiple discharger variance (MDV) may be made available when a large number of dischargers experience similar challenges surrounding a water quality standard. At the time this guidance was written, a federally-approved MDV for phosphorus was available in Wisconsin for municipal and industrial facilities. While the subsequent discussion may be applicable to MDVs for other pollutants in the future, specific examples are provided below for the phosphorus MDV.

The provisions of a variance, when reflected in a facility's permit, may differ between multi-discharger and individual variance options. Regardless of variance type, the highest attainable condition must be demonstrated in order to obtain federal approval of a variance, according to 40 CFR 131.14(b)(iii).

A detailed evaluation of the phosphorus MDV found that the s. 283.16(6)(b) Wis. Stats. watershed provisions (nonpoint phosphorus offsets via a third-party / self-directed watershed project or county payment system) resulted in a highly positive environmental outcome. Therefore, the phosphorus MDV represents the highest attainable condition for a phosphorus variance within the state of Wisconsin. Dischargers seeking a phosphorus variance should first evaluate the MDV. If coverage under the MDV is technically or economically infeasible, the discharger should instead apply for an individual variance.

Source Reduction Measures or Pollutant Minimization Program

SRMs and PMPs are implemented through conditions in WPDES permits which contain a variance to comply with the requirements of s. 283.15(5)(c)2., Wis. Stats. SRM and/or PMP plans are developed by the permittee as a roadmap for pollutant reductions that will occur during the approved variance term and are referenced or included in the permit.

The overall goal of SRMs and PMPs is to improve effluent quality, reduce any adverse impact of the discharge on uses of the receiving waters, ensure reasonable progress towards attainment of the WQS, and, ultimately, achieve compliance with the unvaried WQS. This is accomplished through identifying sources of the variance pollutant, assessing the controllability of the sources of the variance pollutant, implementing strategies to reduce or eliminate the discharge of the variance pollutant to the extent feasible, and monitoring the results in terms of influent and effluent quality.

Pollutant Minimization Program vs. Source Reduction Measures

The terms "Pollutant Minimization Program" and "Source Reduction Measures" are used interchangeably when referencing "plans" and/or "actions". There is no fundamental difference between the two. However, both terms are used in this guidance to be consistent with Wisconsin administrative code language used for the various variance pollutant types (i.e., "pollutant minimization program" is used in s. NR 106.145, Wis. Adm. Code, for mercury discharges and "source reduction measures" is used in s. NR 106.90, Wis. Adm. Code, for chloride discharges.)

SRM/PMP Support of Highest Attainable Condition

Variances must incorporate some mechanism for identifying and achieving attainable water quality improvements (see HAC discussion in Section 1.02). Therefore, SRMs and PMPs are often included to ensure that reasonable progress is made toward attaining the WQS. Short of complying with the WQBEL, SRMs and PMPs are expected to produce the greatest reduction of the variance pollutant feasible. The resulting list of identified feasible reduction options paired with an interim variance limit may be the HAC for that waterbody or facility. See HAC section on page 3 of this guidance document for more information.

Section 2.03: Variance Permit Reissuance Timeline

WPDES permits are issued for time periods not to exceed five years. As a permit nears its expiration date, steps must be taken to reissue the permit with effective dates encompassing the next five years. If a permit is not reissued prior to its expiration date, it is administratively continued, provided the permittee filed a timely application for permit reissuance, no later than 180 days prior to permit expiration.

As a delegated permitting authority, DNR has the responsibility of keeping permits current to ensure permits include updated standards, and to keep the number of expired or "backlogged" permits to a minimum. DNR staff work with permittees to ensure permits are reissued on time. When a variance is requested as part of the permit reissuance, additional time should be allotted to account for additional steps added to the process. As previously mentioned, a permit with a proposed variance may not be reissued until EPA approval of the variance is received by DNR. The permit reissuance timeline for a

typical permit from the time the department receives a completed permit application to the effective date of a new permit is generally anywhere from 90-180 days (or longer). This timeline typically doubles for variance permits and the timeframe is generally anywhere from 175-275 days (or longer).

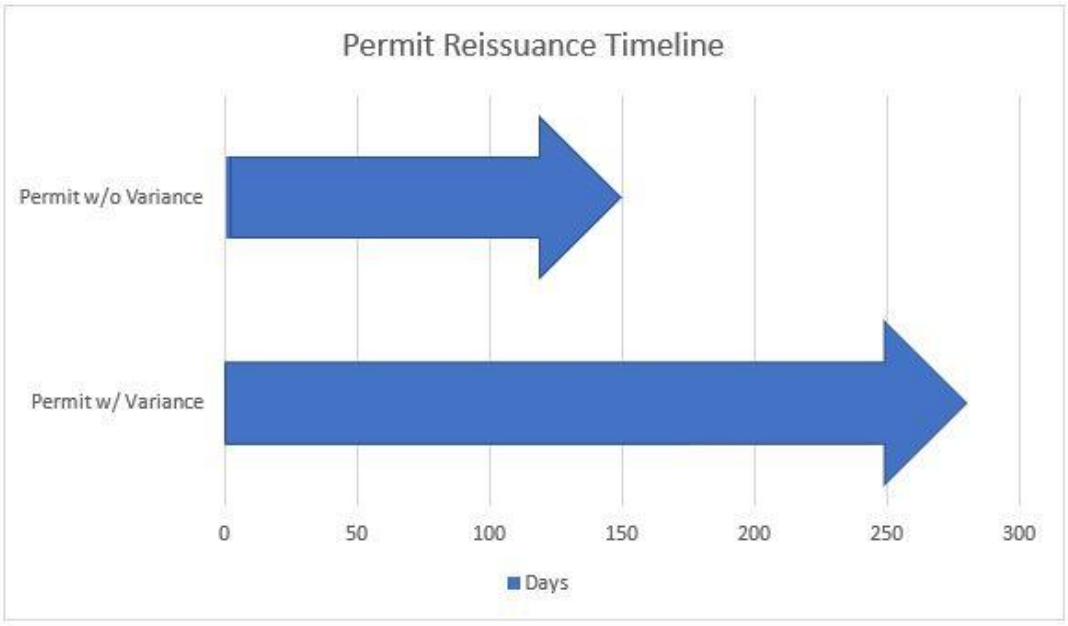
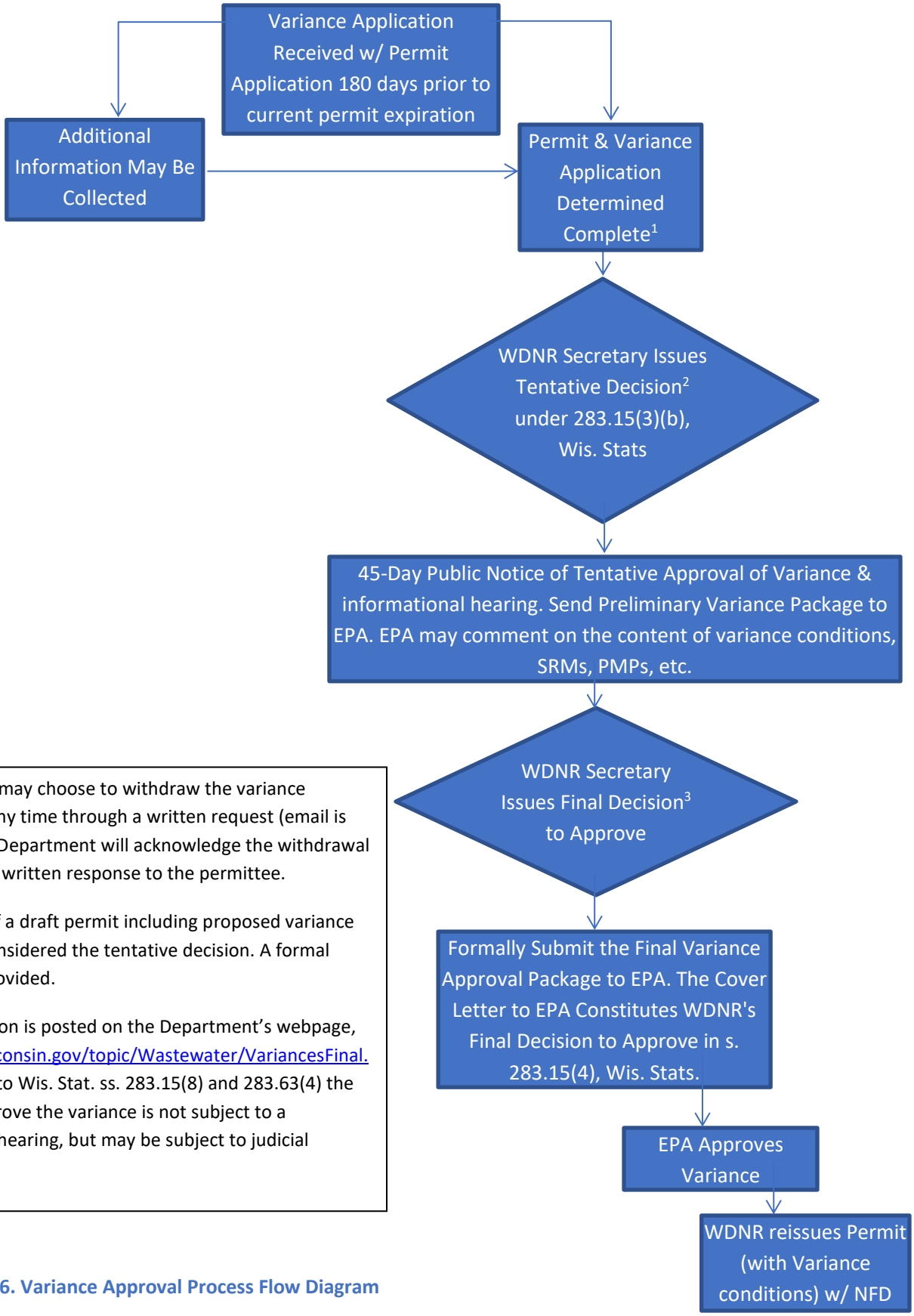


Figure 5. Permit Reissuance Timeline

Simplified Variance Approval Process Flow



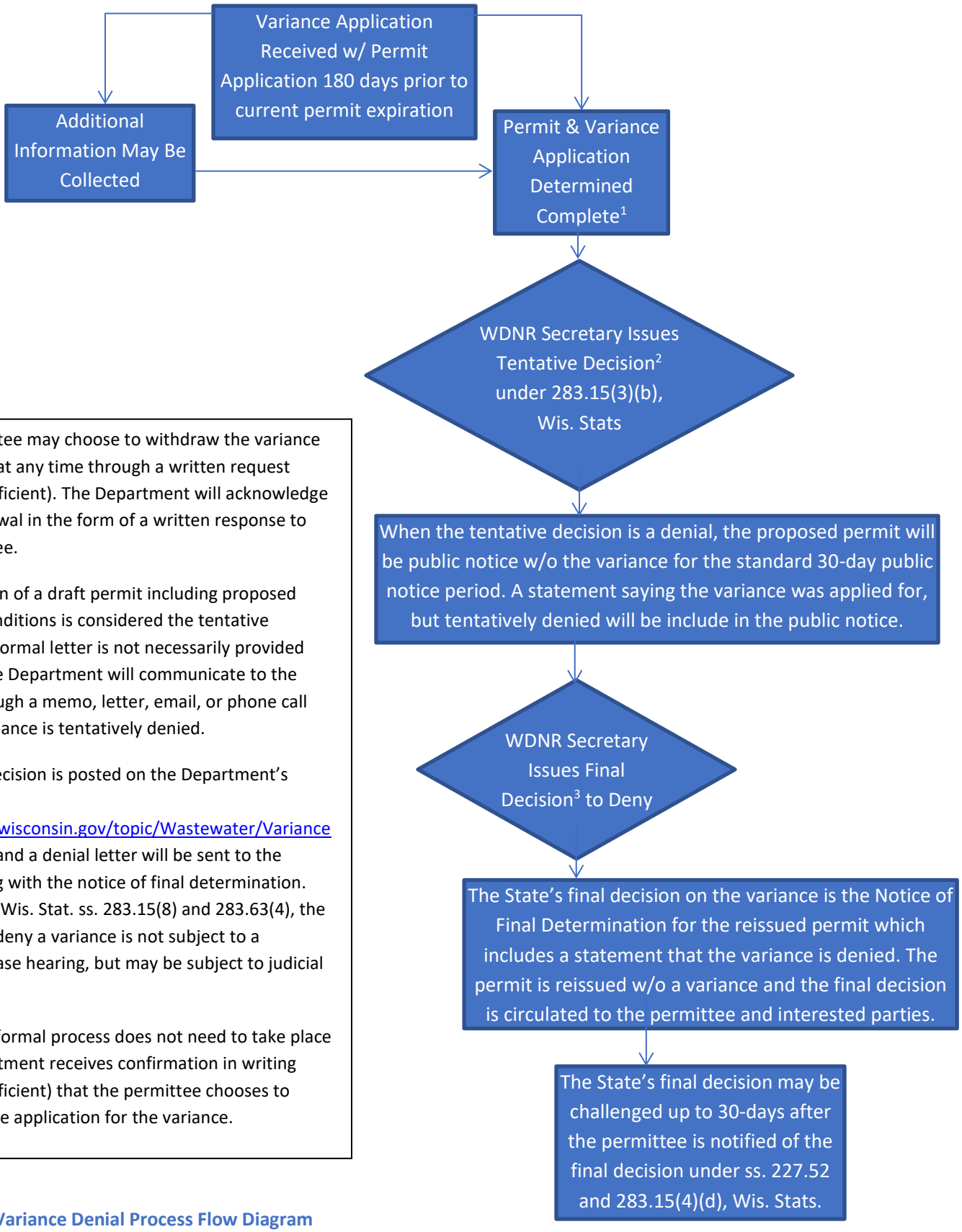
[1]The permittee may choose to withdraw the variance application at any time through a written request (email is sufficient). The Department will acknowledge the withdrawal in the form of a written response to the permittee.

[2]The creation of a draft permit including proposed variance conditions is considered the tentative decision. A formal letter is NOT provided.

[3]The final decision is posted on the Department's webpage, https://dnr.wisconsin.gov/topic/Wastewater/VariancesFinal.html. Pursuant to Wis. Stat. ss. 283.15(8) and 283.63(4) the decision to approve the variance is not subject to a contested case hearing, but may be subject to judicial review.

Figure 6. Variance Approval Process Flow Diagram

Simplified Variance Denial Process Flow



[1]The permittee may choose to withdraw the variance application at any time through a written request (email is sufficient). The Department will acknowledge the withdrawal in the form of a written response to the permittee.

[2]The creation of a draft permit including proposed variance conditions is considered the tentative decision. A formal letter is not necessarily provided however the Department will communicate to the permit through a memo, letter, email, or phone call that the variance is tentatively denied.

[3]The final decision is posted on the Department's webpage, https://dnr.wisconsin.gov/topic/Wastewater/VariancesFinal.html and a denial letter will be sent to the facility along with the notice of final determination. Pursuant to Wis. Stat. ss. 283.15(8) and 283.63(4), the decision to deny a variance is not subject to a contested case hearing, but may be subject to judicial review.

NOTE: This formal process does not need to take place if the Department receives confirmation in writing (email is sufficient) that the permittee chooses to withdraw the application for the variance.

Figure 7. Variance Denial Process Flow Diagram

Chapter 3 – Implementation of Variances in Permits

After the permittee has successfully demonstrated the need for a variance to a WQS, the provisions of the variance need to be incorporated into the terms and conditions of the reissued WPDES permit. Regardless of the pollutant for which the variance is considered, the permittee must continue to demonstrate progress towards achieving the final WQBEL and strive to meet the WQS through measurable actions.

Actions include efforts on behalf of the permittee to implement the SRM or PMP, reporting protocols, and attaining interim limits. When set up correctly, implementation of a variance in a WPDES permit generally follows a Plan-Do-Check-Act cycle with the cycle being completed and reported on an annual basis (See Figure 2 for example). This approach brings greater assurance that both the actions themselves and the timing of implementation that are selected from the SRM or PMP alternatives are based on the resources available to the permittee and the highest likelihood that the action will result in a reduction of pollutant concentration and/or loading to the environment. As responses to actions are not always immediately realized in the permittee's influent or effluent, most permits will have provisions that justify the length of the variance over the entire 5-year permit term.

As mentioned previously, the permittee first needs to demonstrate the need for a variance. This is based on the calculated final effluent limit, the present trends in effluent quality at the facility, and documented and justified treatment technology constraints. It is the permitting authority's responsibility (the department in this case) to determine if that need is legitimate and carries the basic supporting documentation. The permittee then proposes a plan that will justify the length of the variance through scheduled target actions. Some actions will have a specific time-bound element, such as "within the first year" while others will occur on a continuum because they are either reoccurring or there is a greater need to have operational flexibility in the schedule. Writing the SRM or PMP is a critical planning step and may take more than one iteration to get all the elements in place, particularly if this is the permittee's first permit term with a variance. Once the SRM or PMP is approved, the department then incorporates the applicable terms into the WPDES permit both by reference and by specific actions translated into the WPDES permit language.

The following are components of a variance generally found in a WPDES permit:

- Interim limitations for the variance pollutant - - ***See Section 3.01***
- A requirement to implement the approved SRM or PMP plan (Type 3 HAC) - - ***See Section 3.02***
- A requirement to undertake facility upgrades (Type 2 HAC)
- Reporting requirements for each year of the permit term - - ***See Section 3.03***
- Provisions for further evaluation of compliance options

At the end of each permit term, a determination of substantial compliance is made by department compliance staff, which, in part, considers whether or not permit required variance actions were undertaken, and if reporting was sufficient throughout the permit term. If these items are shown to be missing or deficient, pursuant to Wis. Stat. s. 283.15(6), substantial compliance may not be realized, ***compromising the facility's future eligibility for a renewed variance***. DNR compliance staff should work

with permittees to ensure variance requirements are understood and that the permittee's written reports are sufficient during the permit term.

Section 3.01: Interim Limits

Interim limitations are usually set using representative effluent data and are effective on the date of permit issuance. Interim limits and target limits (or target values) are typically expressed as a concentration and are set at a level attainable within the variance term and used to prevent back-sliding on a limit as well as ensure pollutant reduction progress. However, mass values should also be reported on DMRs so this data can be reviewed to see if reductions have occurred. If at least 11 representative effluent monitoring results are available, daily maximum interim limits are usually set equal to the 1-day P_{99} and weekly average interim limitations are set equal to the 4-day P_{99} of representative effluent data. (P_{99} values are calculated using the procedures in s. NR 106.05(5), Wis. Adm. Code.) If there is insufficient data or if previously collected data is deemed no longer representative of the current characteristics of the discharge, alternative methods may be used to establish interim limitations. Interim limits cannot be less stringent than the effluent quality currently attainable as determined by the department.

Mass interim limits in addition to concentration limits may also be appropriate in some situations. For example, if effluent flow rates are variable but the pollutant source should be present at a fairly constant level, an interim mass limit can ensure that back-sliding does not occur.

Interim Limits: Highest Attainable Condition (HAC) and Level Currently Achievable (LCA)

Variance interim limits are set at a level currently achievable for the discharge. The variance must also define a highest attainable condition which will be met by the end of the variance term. Since the highest attainable condition is achieved through Source Reduction Measures (SRM) and Pollutant Minimization Program (PMP) actions over the permit term, this condition is difficult to numerically define. In most variances, highest attainable condition is defined as compliance with the interim limit throughout the permit term plus additional reductions achieved through the SRMs or PMPs (Type 3 HAC). In some cases, however, it may be feasible and appropriate to set a highest attainable condition concentration limit achievable by the permittee after some pollutant reductions. The highest attainable condition limit would be more restrictive than the level currently achievable limit and must be met by the end of the variance term or sooner.

Mercury – The procedure to calculate interim limits or mercury variances is set in s. NR 106.145(5), Wis. Adm. Code. In this section of code, the mercury interim limit is called an "alternative mercury effluent limitation". The interim limit should be set equal to the upper 99th percentile of daily discharge (1-day P_{99}) and expressed as a daily maximum unless this value is greater than the current interim limit. In these cases, the interim limit should be set equal to the current interim limit.

Chloride – The procedure for calculating interim limits for chloride variances are defined in ss. NR 106.82 (2) and (9), Wis. Adm. Code. There it states that the weekly average interim limit should be set equal to the 4-day P_{99} or 105% of the actual maximum weekly average. In the case of a daily maximum interim limit, the interim limit would be set equal to the 1-day P_{99} or 105% of the highest data point.

Section NR 106.82, Wis. Adm. Code, does not specify when each method should be used. However, several factors should be taken into consideration to determine which calculation, 105% or P_{99} is most appropriate for a particular facility. The calculated interim limits using each method should be compared to the actual recent weekly averages. The resulting interim limit should represent a level currently achievable by the discharge but cannot be less stringent than the previous interim limit. In most cases, the appropriate interim limit will be set equal to the 4-day P_{99}. While administrative code allows for the 105% calculation, this level is typically much higher than the 4-day P_{99} and is usually too high to represent a level currently achievable by the discharge. The 105% limit should not be used as an interim limit if it doesn't accurately represent the best level currently achievable by the discharge under the variance. The 105% calculation is generally only appropriate for facilities with insufficient data to calculate a P_{99}.

Chloride: Target Limit vs. Target Value
(s. NR 106.82, Wis. Adm. Code)

A **target limit** is an **enforceable** effluent limitation which the permittee can reasonably meet within the term of the permit, following implementation of appropriate voluntary source reduction activities, and is usually effective at the end of permit term.

A **target value** is an effluent concentration of chlorides which a permittee may be expected to reasonably meet following implementation of appropriate source reduction activities. A target value is typically set at a value which is a 10-12 % reduction from the level currently achievable. It is not an enforceable limitation under the terms of the permit program but establishes a measure of progress of source reduction activities.

Copper – No procedure for calculation of copper interim limits is specified in administrative code. Because copper limits are expressed as weekly averages and/or daily maximums like chloride, a similar procedure is recommended to determine appropriate interim limits for copper. Generally, 4-day and 1-day P_{99} values accurately represent a level currently achievable for weekly average and daily maximum limits, respectively.

Arsenic – No procedure for calculation of arsenic interim limits is specified in administrative code. Generally, a daily maximum limit set equal to the 1-day P_{99} value is recommended, similar to mercury variances. However, alternative approaches for setting an interim limit may be more appropriate depending on the situation.

Phosphorus – No procedure for setting phosphorus interim limits for individual variances is specified in administrative code. Possible interim limits should be compared to actual monthly average phosphorus concentrations to ensure that the limit can be consistently met by the discharge. Generally, phosphorus interim limits are set equal to 4-day P_{99} or 30-day P_{99} values and expressed as a monthly average based on the variability of the available data set. The interim limit should represent a level currently achievable by the discharge, but the limit should not allow backsliding as the facility works to reduce phosphorus discharges. Interim limits for the phosphorus MDV are covered in a separate guidance document. For more information about the MDV visit: https://dnr.wi.gov/topic/wastewater/phosphorus/statewidevariance.html.

Section 3.02: Source Reduction Measures/Pollutant Minimization Program

SRM and PMP plans can include many different actions (but are not limited to): financial incentives, outreach and education, technical support, and mandated measures. Figure 8 shows steps in selecting, implementing, and evaluating source reduction measures for a municipal wastewater treatment facility. The process begins with collecting data about the specific variance pollutant's use and presence in the community and by calculating a mass balance. Based on these data, as well as cost and other considerations, a facility may choose to exclude source reduction measures not suitable for the community. If, during the course of the permit term, a permittee needs to modify or make changes to the SRM or PMP plan they should reach out to their DNR compliance staff in consultation with the Statewide Variance Coordinator. If the changes are determined to be significant enough to affect the variance's HAC, reapproval at the state and federal levels would be required. Once the updated SRM or PMP plan is approved, a permit modification would be required to incorporate changes.

The suitable measures can then be compared using a cost-benefit analysis. Once the measure(s) selected are implemented, their effectiveness can be discussed and evaluated in the annual report, and the SRM or PMP plan can be adjusted as needed. Engaging and educating the community as measures are selected, implemented, and evaluated is important to the success of the SRM or PMP plan.

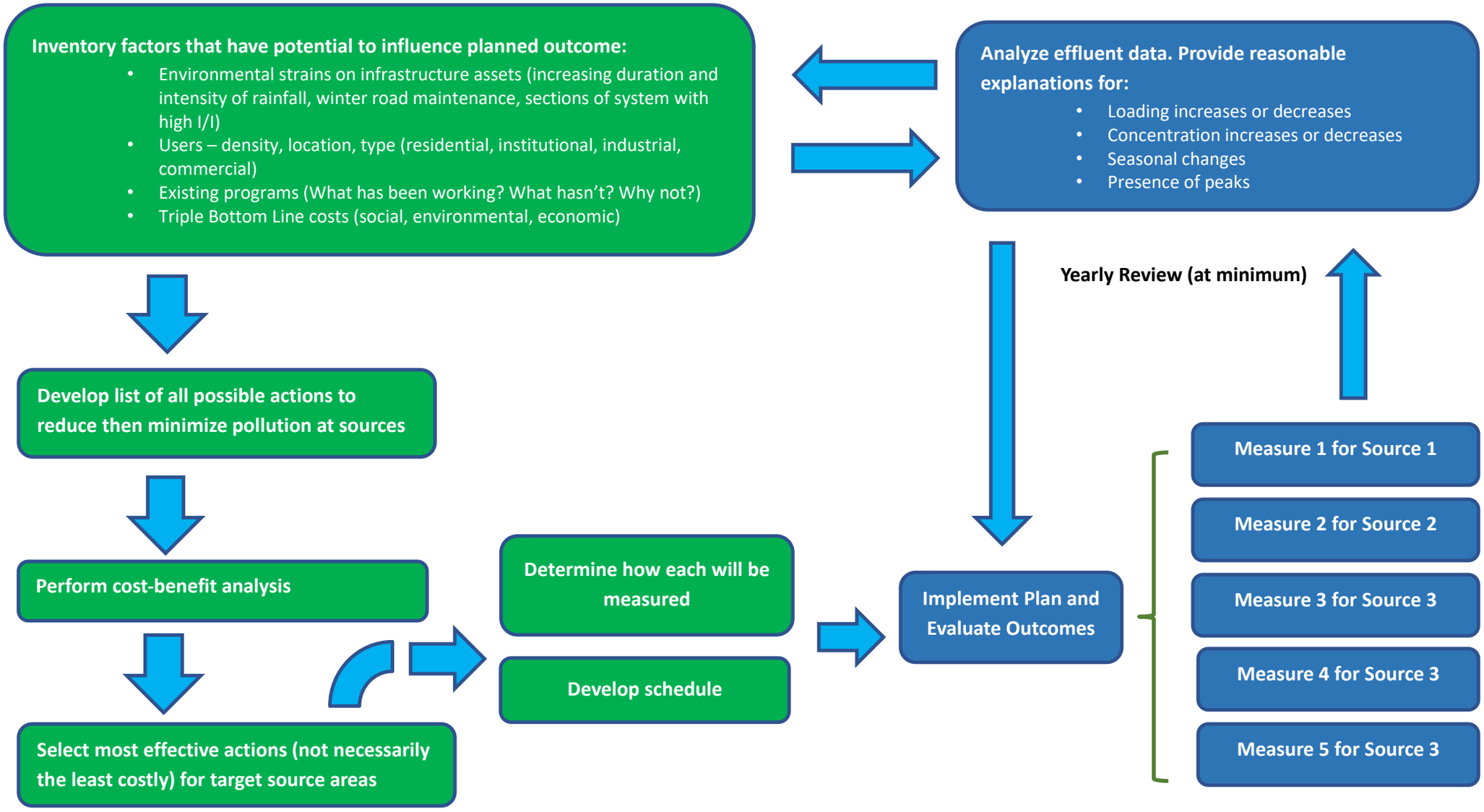


Figure 8. Steps in Selecting, Implementing, and Evaluating Source Reduction Measures

Basic Considerations for SRM and PMP Action Selection

1. Identify and quantify known and suspected sources of variance pollutants and separate into categories. Categories should be targeted to the individual source and specific enough to allow for meaningful actions (i.e., reporting requirements, qualitative analysis, and targeted outreach).

> **EXAMPLE 1** – Water softeners have been identified as a known source of chloride to WWTFs. As an SRM action item "Investigate water softener usage within collection system.", is very general and doesn't allow for meaningful actions. Instead, the action item could be **"Conduct a survey of water softeners within the collection system. Provide a breakdown on the number of residential, commercial, and industrial water softeners and include information on age, type, and condition (if applicable)."** An action item like this could be broken down into more iterative actions if necessary.

2. Include a list of all potential variance pollutant sources along with a mass-balance analyses. The following table is an example of a potential source identification summary for a municipal chloride variance facility.

EXAMPLE 2 – Source Identification Summary

Chloride Source Category	Annual Average Chloride Mass (lbs/day)	Annual Percent of Total
Background from potable water supply wells	59,400	11%
Residential	270,000	50%
Commercial	48,600	9%
Industrial	70,200	13%
Public Authority	37,800	7%
Hauled Wastes (septage, holding tank, and leachate)	10,800	2%
Road De-Icing (through I/I)	43,200	8%
TOTAL	**540,000**	**100%**

3. Identify actions for each of the identified sources or category of sources. Notice from Figure 8 on the previous page that more than one measure/action can be targeted to address a source.
4. Provide actions that are iterative, building on any existing facility-specific information available, especially information generated as a result of previous variances or implemented actions.

Setting up SRM and PMP Actions for Better Tracking

It is recommended that the S.M.A.R.T acronym be utilized during further development of SRM/PMP actions. In this instance, S.M.A.R.T stands for Specific, Measurable, Achievable, Relevant, and Time-Bound.

S Specific	Select clear and concise actions (with no ambiguous language) that states exactly what will be accomplished (e.g., who, what, when, where, why). This makes the action easier to implement, easier to communicate, and easier to achieve. This also demonstrates a strong understanding of the problem and what needs to be done to address it.
M Measurable	Select actions that are quantifiable. This makes it easier to evaluate the extent to which the action has been met. Where possible, actions should use metrics or data, and/or provide evidence to track progress and success. The action should also be reevaluated when necessary. In some cases, the measurement will be in the fact that the task is completed. In other instances, the measurement may be a simple comparison (i.e., increase or decrease over specified evaluation period). Lastly, the SRM or PMP may incorporate easily tracked and quantifiable means in which to measure effectiveness, such as dollars awarded from an incentive program in a calendar year or number of collection system monitoring points assessed.
A Achievable	Select actions where the tools and/or resources are available to attain the goal. Actions should also be technically feasible, for example eliminating I/I by the end of a 5-year permit term may not be technically feasible but reducing I/I 20% by the end of a 5-year permit term is. Selected actions may be challenging but should be achievable. In doing so, possible limitations should be carefully considered as removing these limitations or lessening the burden of them may become an action worth pursuing under the SRM or PMP in and of itself.
R Relevant	Select actions that are relevant to the characteristics of the facility, that can be accomplished on a sustained basis with the available resources, and that have high likelihood to demonstrate meaningful progress. Actions should be relevant to the pollutant of concern.
T Time-bound	Select actions to be performed in each year of the variance term and specify a time frame in which the action will be accomplished. The term of the variance must only be as long as necessary to achieve the highest attainable condition, 40 CFR 131.14(b)(iv).

Figure 9. SMART Description

Section 3.03: Annual Report Submittals

The permittee's responsibility, in addition to implementing the SRM or PMP plan as part of permit requirements, is to document and communicate to DNR, EPA, and the interested public what actions were or were not completed during the previous calendar year. This documentation is in the form of reports required by the permit on an annual basis. Annual reports should document and retain the

qualitative and quantitative data used in an assessment process, the outcomes of the assessment, which sources have been addressed, strategies applied, and outcomes.

It is essential that annual reports are thorough and include summaries and supporting documentation of all actions performed in order to establish that HAC and other variance requirements were met. Permittees should document all source reduction actions taken to reduce effluent concentrations, including any actions beyond what is prescribed in the permittee's SRM or PMP plan, regardless of whether the action ultimately resulted in a measurable change in effluent concentrations or influent load. DNR and EPA understand that not all source reduction measures will be successful or result in significant pollutant reductions. In those cases, it is important for facilities to document why a measure was not successful and/or why it was not completed. Potential adjustments to the SRM or PMP plan during the permit term to increase source reduction effectiveness should be discussed with compliance staff before implementing the change. Proper documentation through annual reports can help avoid possible compliance issues during the permit term and expedite the review of any possible future variance requests.

Appendix D includes a "Variance Report Annual Checklist" to assist permittees in completing the annual report and DNR compliance staff in reviewing reports. The document lists the expectations and deliverables for the annual reports. Failure to submit annual reports by the assigned due dates or that do not meet the expectations as indicated by the permit and checklist may be considered non-compliant with the permit and the Department may take enforcement action.

The annual report requirement is included within a WPDES permit as a schedule, as shown in the example template below. This schedule shows mercury as the example pollutant, but can be tailored to other variances by changing the pollutant and the data analysis based on frequency of sampling. Note that the permit requires that a permittee continue to submit annual reports in the event that the permit is not reissued on time.

EXAMPLE 3 – Mercury Pollutant Minimization Program Variance Schedule

Required Action	Due Date
Annual Mercury Progress Reports: Submit an annual mercury progress report related to the pollutant minimization activities for the previous year. The annual mercury progress report shall: Indicate which mercury pollutant minimization activities or activities outlined in the Pollutant Minimization Program Plan have been implemented and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of whether each implemented pollutant minimization activity appears to be effective or ineffective at reducing pollutant discharge concentrations and identify actions planned for the upcoming year; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next year to help address these barriers; Include an analysis of trends in total effluent mercury concentrations based on mercury sampling; and	01/31/20XX

Include an analysis of how influent and effluent mercury varies with time and with significant loading of mercury. The first annual mercury progress report is to be submitted by the Due Date.	
Annual Mercury Progress Report #2: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/20XX
Annual Mercury Progress Report #3: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/20XX
Annual Mercury Progress Report #4: Submit a mercury progress report, related to the pollutant minimization activities for the previous year, as defined above.	01/31/20XX
Final Mercury Report: Submit a final report documenting the success in reducing mercury concentrations in the effluent, as well as the anticipated future reduction in mercury sources and mercury effluent concentrations. The report shall: Summarize mercury pollutant minimization activities that have been implemented during the current permit term and state which, if any, activities from the Pollutant Minimization Program Plan were not pursued and why; Include an assessment of which pollutant minimization activities appear to have been effective or ineffective. Evaluate any needed changes to the pollutant reduction strategy accordingly; Identification of barriers that have limited program effectiveness and adjustments to the program that will be implemented during the next variance term (if applicable) to help address these barriers; Include an analysis of trends in mercury concentrations based on sampling and data during the current permit term; and Include an analysis of how influent and effluent mercury varies with time and with significant loadings of mercury. If the permittee intends to reapply for a mercury variance per s. NR 106.145, Wis. Adm. Code, for the reissued permit, a detailed pollutant minimization plan outlining the pollutant minimization activities proposed for the upcoming permit term shall be submitted along with the final report. An updated pollutant minimization program plan shall: Include an explanation of why or how each pollutant minimization activity will result in reduced discharge of the target pollutant; Evaluate any new available information on pollutant sources, timing, and concentration to update the mass balance assumptions and expected sources of the pollutant; and Identify any information needs that would help to better determine pollutant sources and make plans to collect that information.	6 Months Prior to Expiration
Annual Mercury Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires the permittee shall continue to submit annual mercury reports for the previous year following the due date of Annual Mercury Progress Reports listed above. Annual Mercury Progress reports shall include the information as defined above.	

Chapter 4 – Development of SRM and PMP Plans for Specific Pollutants

This chapter provides a more comprehensive overview of the pollutants for which variances are commonly granted in Wisconsin. Information relevant to the development of SRM and PMP plans is provided for each pollutant, including common pollutant sources and treatment technology limitations. Interim requirements, strategies to support highest attainable condition, and final compliance goals are also presented in narrative form here. Pollutant-specific SRM and PMP actions are available in each of the corresponding sections with additional phosphorus PMP actions in Appendix F. As mentioned in other sections of this guidance, SRM and PMP actions should be tailored to each facilities unique situation and there is no-one-size fits all SRM or PMP plan that must be followed.

Pursuant to s. 283.15(5)(c)(2), Wis. Stats., the Department may require, in variance permits, investigation of treatment technologies, process changes, pollution prevention, wastewater reuse, or other techniques that will result in compliance with the applicable water quality standard. SRM and PMP plans are incorporated by reference in reissued permits, and are the primary mechanism used to document and convey the requirements of an approved variance. The SRM or PMP plan referenced in a reissued permit also fulfills requirements for type 3 highest attainable condition, as required by federal regulations.

SRM and PMP plans allow facilities to work within their means to make the best possible incremental improvements towards compliance with a water quality standard. An approvable SRM or PMP plan will support DNR's determination that a proposed variance meets highest attainable condition requirements.

Communicating with customers/rate payers and decisionmakers is critical to success at every step in the process of assessing, selecting, and implementing SRM and PMP plans. Customers are likely to bear at least some of the cost of whatever measures are chosen. Preparing customers for a potential financial impact, and educating them to recognize the longer-term economic, environmental, and community value of reducing the variance pollutant levels in local waterbodies, will help make this process easier.

SRM and PMP Plans Should

- **Evaluate** known sources and propose specific actions to address those sources that may lead to pollution reduction over time.
- Propose **specific actions** that lead to pollution reduction in effluent or the receiving water over time.
- Include actions for **each year** of the five-year permit term.
- Provide a protocol which evaluates the **effectiveness** of actions and conveys the assessment to DNR and EPA via an **annual report**.
- Include measures to **address** as many **known sources** as possible.
- Include measures to help **identify** unknown sources.

Section 4.01: Chloride

Chloride in the environment can come from many sources, including but not limited to water softeners (via the municipal wastewater treatment plant), winter road maintenance activities, fertilizers, and industry. Once chloride enters the environment it cannot easily be removed. Even with end-of-pipe treatment, which can be very costly and energy intensive, chlorides are only moved from one media to another (i.e., from liquid to solid waste). Therefore, identifying and reducing chloride at its source results in a better long-term environmental outcome, is important to achieving highest attainable condition, and may ultimately lead to compliance with the water quality-based effluent limit.

Since each facility seeking a chloride variance is unique, there is no one-size-fits-all SRM plan that must be followed. The information in this section presents potential source reduction activities for known chloride contributing sectors and can be used to tailor an SRM plan to fit a facility's specific circumstances. It should also be noted that a facility is not limited to the actions presented here and the list of actions is based on current and/or past actions implemented by permittees.

Chloride Sampling Frequency

The recommended sample frequency for chlorides is 4 times per month with samples collected on four consecutive days. When four consecutive days are monitored, the averages of those concentrations can be used to;

- Help determine the necessity of a weekly average WQBEL, in accordance with s. NR 106.05(3)(b), Wis. Adm. Code.
- Account for daily variability (due to weather conditions and other factors) and the potential to "smooth out" the maximums.
- Afford a better opportunity for a direct comparison with a weekly average limit.
- Demonstrate better chloride reductions than a P_{99} determination using the same number of non-consecutive samples.

Residential Discharges to Municipal WWTFs

Most facilities that currently have chloride variances are located in the southern and eastern portions of the state where limestone/dolomite aquifers produce a naturally hard water. Many households in these regions utilize point-of-entry (POE) sodium cycle ion exchangers ("softeners") to remove water hardness, which are currently the most cost-effective POE technology available for households. Even if a community centrally softens its water supply using membrane technology, there is a significant continuous reject stream associated with these devices. The installation of central softening facilities, using either ion exchange or membranes, is also a large capital investment for a community and greatly increases the operational cost of providing potable water.

Understanding a community's softener fleet, such as if softeners are regenerated based on a time period that has passed (time-initiated regeneration or TIR) or based on actual water use (demand-initiated regeneration or DIR, the age of the softeners, and how recently the softeners have been tuned,

are all important components of developing a strategy to reduce chloride from residential softeners. Table 2 below lists potential SRM actions related to residential softeners and the associated metric that could be included in an annual report.

(See Appendix E.1 for an example water softener survey)

(See Appendix E.2 for an example template for water softener survey letter)

(See Appendix E.3 for a table of potential water softener education and outreach actions)

Table 2. Cl Residential Water Softener SRM Actions

RESIDENTIAL WATER SOFTENER - ACTIONS	REPORT OUT/METRIC
Collect data to understand the problem and efficient methods to address it.	Survey data on barriers/motivation, survey of age and type of water softener.
Educate homeowners on the impact of chloride from residential softeners, discuss options available for increasing softener salt efficiency, and request voluntary reductions.	Target audience, method used, number of people reached, number participating.
Recommend residential softener tune-ups on a voluntary basis.	Target audience, method used, number of people reached, number participating.
Request voluntary support from local water softening businesses in the efforts described above.	Companies contacted with response, method of contact, follow up strategy based on response.
Educate licensed installers and self-installers of softeners on providing optional hard water for outside faucets for residences.	Companies contacted with response, method of contact, follow up strategy based on response.
Evaluate a mandate/ordinance for high salt efficiency standards for new residential water softeners.	Govt. officials contacted and response, date, response, follow up strategy based on response.
Mandate DIR and high salt efficiency standard for new residential softeners.	Date and ordinance.
Evaluate the potential for a rebate program to install high efficiency water softeners.	Evaluation of cost, methods of outreach.
Implement a rebate program to install DIR and high salt efficiency water softeners.	Number of people in program, number of people contacted by outreach, plan to increase participation in next round.
Evaluate the potential of subsidies for a reduced-cost residential softener tune-up program.	Evaluation of cost, methods of outreach.
Subsidize a reduced-cost residential softener tune-up program.	Number of people in program, number of people contacted by outreach, target audience, method.
Evaluate an ordinance mandating participation in a tune-up program.	Govt. officials contacted and response, date, response, follow up strategy based on response.
Mandate participation in a residential softener tune-up program, which involves qualified periodic servicing to ensure proper control settings and adjustments.	Metrics associated with inspection/compliance, follow up strategy to increase %.

Mandate more frequent tune-ups as part of tune up program if original interval is insufficient.	Metrics associated with inspection/compliance, follow up strategy to increase %.
Evaluate the imposition of installation restrictions so that outside hose bibs are on unsoftened water. If restrictions are imposed, new homes and those in real estate transfers should be required to have plumbing restrictions for hard water by-passes, and the requirement should apply to self-installed equipment as well.	Evaluation of cost, methods of outreach, numbers reached.
Mandate installation of plumbing to ensure unsoftened water goes to outside hose bibs.	Metrics associated with inspection/compliance, follow up strategy to increase %.

Table 3. Cl Municipal Drinking Water System SRM Actions

MUNICIPAL DRINKING WATER WITH ION EXCHANGE - ACTIONS	REPORT OUT/METRIC
Optimize operation of water softeners.	Records of optimization, plan for future maintenance of optimal performance.
Evaluate age and efficiency of resin/water softener. Determine when replacements are necessary.	Plan and records of implementation of plan for replacement.
Evaluate brine reclamation.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Install brine reclamation, if feasible.	Record installation/plan for implementation.
Evaluate beneficial brine reuse of regeneration brine.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Soften water to a higher level of hardness.	Records installation/plan for implementation.
Evaluate installation of reverse osmosis treatment on regeneration brine.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Install RO treatment on regeneration brine waste stream.	Records installation/plan for implementation.
Evaluate replacement of traditional ion exchange water softener with a salt free technology, such as an industrial water conditioner.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Replace traditional water softener with salt free technology.	Records installation/plan for implementation.

Evaluate blending of softened water with unsoftened (hard) water to reduce the about of softened water used.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Blend softened water with unsoftened (hard) water.	Records installation/plan for implementation.

Commercial/Institutional Discharges to Municipal WWTFs

Commercial (e.g., hotels, restaurants, laundromats, carwashes, etc.) and institutional (e.g., schools, residential care facilities, municipal buildings, etc.) users can also contribute chlorides to a WWTF. Chloride can come from water softeners used at the facility or from the activities being conducted at the facility (e.g., salt washed off vehicles). The following tables (Table 4 – 7) list potential SRM actions related to commercial/institutional facilities and the associated report out/metric that could be included in an annual report.

Table 4. Cl Commercial/Institutional Water Softener SRM Actions

Commercial/Institutional FACILITIES WITH WATER SOFTENERS - ACTIONS	REPORT OUT/METRIC
Identify the type and efficiency of water softeners.	Survey data including age and type of water softener.
Work with facility to replace water softeners with high efficiency/DIR softeners.	Survey data on barriers/motivation, survey of age and type of water softener.
Evaluate a rebate program for businesses/facilities to replace water softeners.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Implement a rebate program for businesses/facilities to replace water softeners.	Target audience, method of outreach, number of people reached, number participating, methods to increase %.
Evaluate brine reclaim systems for large-scale users.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
As applicable, work with facilities to install brine reclaim.	Participating entities, amount reclaimed.
Evaluate the potential for local brine reuse with water softener regeneration brine as ice control.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
As applicable, implement reuse of brine for ice control.	Participating entities, amount reclaimed.
Evaluate replacement of traditional ion exchange water softener with a salt free technology, such as an industrial water conditioner.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Replace traditional water softener with salt free technology.	Records installation/plan for implementation.
Evaluate blending of softened water with unsoftened (hard) water to reduce the about of softened water used.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Blend softened water with unsoftened (hard) water.	Records installation/plan for implementation.

Table 5. Cl Laundry Facility SRM Actions

LAUNDRY FACILITIES - ACTIONS	REPORT OUT/METRIC
If water softeners are present, fill out SRMs under Commercial/Institutional FACILITIES WITH WATER SOFTENERS section above.	See Table 4 above.
Determine chloride content of detergents, pouring aids, and other laundry products.	List of all detergents, etc. used with chloride content of each.
Evaluate if any identified detergents, pouring aids, and other laundry products can be replaced with a lower chloride content product.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Evaluate the use of water efficient laundry equipment.	Provide inventory of current equipment, plan to update equipment (if feasible) with timeline.

Table 6. Cl Carwash Facility SRM Actions

CARWASH FACILITIES - ACTIONS	REPORT OUT/METRIC
If water softeners are present, fill out SRMs under Commercial/Institutional FACILITIES WITH WATER SOFTENERS section above.	See Table 4 above.
Evaluate the use of high pressure, low volume washing techniques and equipment.	Provide an inventory of current equipment. Provide a plan to update equipment (if feasible).
Evaluate the use of prewash systems with separate collection tanks for prewash water.	Provide an inventory of prewash systems along with a plan to update any existing facilities.
Evaluate the feasibility of hauling separately collected prewash water to a centralized waste hauler or WWTF that does not have a chloride limit.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Create a sewer use ordinance for any new carwashes to install a prewash system with separate collection and disposal of prewash water.	Provide a detailed plan to implement (if feasible) with timeline.

Table 7. Cl Truck Washing Facility SRM Actions

TRUCK WASHING FACILITIES - ACTIONS	REPORT OUT/METRIC
If water softeners are present, fill out SRMs under Commercial/Institutional FACILITIES WITH WATER SOFTENERS section above.	See Table 4 above.
Engage with road department to implement salt storage BMPs.	Road applicators contacted with dates and responses; if applicable, MS4 permit holders contacted.

Evaluate the feasibility of reusing truck wash or salt storage run-off as road deicer.	Road applicators contacted with dates and responses, evaluation of those costs.

Industrial Discharges to WWTFs

Industrial users may also be sources of chloride to a WWTF. This source can be from water softeners used at the facility or from activities associated with the industrial process. Tables 8 and 9 below list potential SRM actions related to industrial discharges to WWTPs and the associated report out/metric that could be included in an annual report. These actions are intended to be included in SRM plans for WWTFs with chloride contributing industrial users.

Table 8. Cl Industrial Facility Water Softener SRM Actions

INDUSTRIAL FACILITIES WITH WATER SOFTENERS - ACTIONS	REPORT OUT/METRIC
If water softeners are present, fill out SRMs under Commercial/Institutional FACILITIES WITH WATER SOFTENERS section above.	See Table 4 above.

Table 9. Cl Industrial Dischargers to WWTFs SRM Actions

INDUSTRIAL DISCHARGERS TO WWTFs - ACTIONS	REPORT OUT/METRIC
Create and maintain an inventory of known chloride industrial sources.	Provide facility inventory along with information about each facility's current chloride reduction practices.
Engage with industrial sources to identify and implement feasible chloride reduction measures.	Meeting information (date, names), report of SRMs with follow-up measures.
Request voluntary reductions in chloride input from industrial contributors.	Meeting information (date, names), report of SRMs with follow-up measures.
Train plant personnel to be more aware of salt conservation, emphasizing simple, cost-effective housekeeping measures. For example, spilled salt can be cleaned up as a solid waste rather than flushed down the floor drain.	Records of training completed number of people in training program/attending training.
Conduct activities that improve and optimize equipment and processes, eliminate wasteful practices, and establish recycling practices to achieve chloride reductions.	Detailed description of actions completed with dates.
Implement pretreatment standards to establish more restrictive local pretreatment limits through the adoption of a sewer use ordinance or amending the existing sewer use ordinance.	Provide a detailed plan to implement (if feasible) with timeline.

Sewer Use Ordinances for WWTFs

Mandated measures for various sectors can range from requirements for softener tune-ups, high-efficiency softeners, and hard water bypasses to surcharges and treatment system evaluations. While these measures can be effective, establishing legal requirements for them may not be possible in every community.

Municipal or Local Sewer Use Ordinance

Rules, regulations, or codes enacted into law by local or municipal government used to protect sanitary sewer assets, set fines, or create discharge limitations to prevent high strength waste, FOG, or illicit discharges from entering a municipal collection system. Ordinances may also be used to limit or prevent clearwater sources from roof and foundation drains as well as basement sump pumps.

However, Sewer Use Ordinances (SUOs) are recommended for all municipalities. A SUO is a helpful legal tool that not only establishes regulations on what can be discharged to the sanitary sewer system, but also legal responses to be taken by the municipality (i.e., fines & citations) if violations occur. SUOs are a requirement for any community that receives a Clean Water Fund Loan (s. NR 162.08(2)(a), Wis. Adm. Code), but SUOs are a necessity for implementing certain requirements for all POTWs. These requirements relate to prohibited wastes and pretreatment (ss. NR 205.07(2)(a)-(c), Wis. Adm. Code) and a municipal Capacity, Management, Operations, & Maintenance (CMOM) Program (s. NR 210.23(4)(c), Wis. Adm. Code.). In order to properly manage a collection system, a sewer use ordinance should be in place.

At a minimum it is recommended that a SUO includes conditions pursuant to ss. NR 211.10(1) & (2), Wis. Adm. Code, which covers all pollutants in general versus s. NR 211.40, Wis. Adm. Code, which applies to chlorides specifically.

Winter Road Maintenance and I/I for WWTFs

Since the implementation of the chloride rule (ch. NR 106, subchapter VII, Wis. Adm. Code), data submitted to the department shows that all POTWs are affected by the intrusion of road salt into the collection systems in the winter and spring months. Road salt intrusion can have the effect of increasing the mass discharge to twice as much as the mass during the “non-snowmelt” months (usually July through November). In general, concentrations during the first five to six months of the year tend to be higher than the last six months.

The following table lists potential SRM actions related to winter road maintenance and the associated report out/metric that could be included in an annual report. If the POTW and the owner and operator of a permitted Municipal Separate Storm Sewer System (MS4) are the same governing body, then it may be easier to connect the importance of reducing salt use and following a winter road maintenance plan to the POTW effluent quality. It should be noted that the actions listed in the table below are not replacements for requirements that may be found in an MS4 WPDES permit. Additional learning

resources on transport of salt in storm water runoff can be found on the department's webpage at: https://dnr.wisconsin.gov/topic/Stormwater/learn_more/salt.html.

In addition to the variability caused by road salt intrusion during snow melt (i.e., higher concentrations due to the presence of more salt), there can be variability due to clear water intrusion (I/I) into the collection system at other times of the year, when road salt is not contributing to the chloride mass. For example, the chloride concentration results for a rainy day in August may be lower than a dry day, due to dilution from I/I. However, it is possible that the overall chloride mass may be the same due to the high discharge flow rate (Mass = Concentration × Flow Rate × 8.34). Therefore, there is a strong correlation between variability in weather and the resulting variability in chlorides discharged from POTWs.

Table 10. Cl Municipal Winter Road Maintenance and I/I SRM Actions

MUNICIPAL WINTER ROAD MAINTENANCE - ACTIONS	REPORT OUT/METRIC
Reduce inflow into collection system through CMOM implementation (domestic collection system).	Records of optimization, plan for future maintenance of optimal performance.
Education and outreach to municipal officials and public works departments on impacts of winter road maintenance on treatment plant effluent quality.	Frequency, method of outreach, copy of meeting minutes, resulting changes in good housekeeping.
Develop, disseminate, and implement winter road maintenance plan*	Record installation/plan for implementation.
Calibrate spreaders and truck equipment annually*.	Record of work performed/adjustments made.
Train drivers on winter road maintenance practices and tracking*.	Detailed description of cost/barriers, why feasible/infeasible, plan to change (if feasible) with timeline.
Build anti-icing and salt brine deicing capacity*.	Record of type of equipment/process changes and winter deicing product used.
Overlay winter road management reporting metrics (mapping and usage) under MS4 permit with collection system to locate potential hotspots for inflow reduction work*.	Record of work performed/adjustments made.

*Applies in particular to POTW and public works/streets department under same governing body.

Industrial Dischargers

Industrial dischargers have been successful in reducing chloride using SRMs and there are currently no chloride variances for industrial dischargers in Wisconsin. Industries have found success by understanding and evaluating all industrial processes to determine where chloride reductions could occur. For example, cheese manufacturers have seen significant chloride reductions using technology for brine reclamation and other chloride reductions have been achieved through reconfiguring and/or modifying brining operations to minimize brine spills. Some industrial facilities have also partnered with

local county highway departments to use waste brine from the industrial processing operations as a substitute for brine made purely from mined salt. These actions are economical and reduce the release of chloride to the environment. Tables 11 – 14 list SRM actions implemented by industrial dischargers.

Table 11. Cl All Industrial Discharger SRM Actions

ALL Industrial Dischargers - ACTIONS	REPORT OUT/METRIC
Train plant personnel to be more aware of salt conservation, emphasizing simple, cost-effective housekeeping measures. For example, spilled salt can be cleaned up as a solid waste rather than washed down the floor drain.	Provide a record of any trainings held and description of salt conservation measures taken.
Investigate source reduction activities that improve and optimize equipment and processes, eliminate wasteful practices, and establish recycling practices where feasible.	Report out on source reduction activities. Include description of activities along with measure of any reductions.
Maintain records of salt usage for all purposes (water treatment, manufacturing, winter maintenance, etc.) and other production variables sufficient to show if efforts to minimize salt usage are successful.	Report out annually on facility salt usage records and include comparison from previous years.
Conduct and inventory of all water softeners used at the facility.*	Report out on the number, type, and age of water softeners.
Optimize softener operation to ensure the appropriate regeneration interval and salt dosage are used.*	Provide a detailed description of actions completed with dates, plan to keep softeners optimized.
If the softener regeneration is manual or timer-initiated, evaluate the feasibility of switching to a DIR controller.*	Provide a detailed summary of cost, why switching is feasible or infeasible, and a timeline for replacement if feasible.
Determine which subprocesses can tolerate unsoftened water and make appropriate changes.*	Provide a detailed description of all processes that use softened water and why/why not they need to use soft water. Provide a plan to make appropriate changes and include a timeline for changes.
Evaluate the feasibility of softener brine reclamation.*	Provide a detailed description of cost, why feasible/infeasible. If feasible, include a plan for making the changes along with a timeline for changes.

*Applies only to those industrial dischargers using ion exchange water softeners.

Table 12. Cl Dairy Industry SRM Actions

DAIRY Industry - ACTIONS	REPORT OUT/METRIC
Improve the handling of salt brines and the handling of cheese into and out of brine systems. Consider capital improvements such as automating the brine system, properly designed drip pans and splash guards.	Provide a detailed description of costs, other barriers to improvements, why feasible/infeasible, and a plan to change (if feasible) with timeline.

DAIRY Industry - ACTIONS	REPORT OUT/METRIC
Determine whether once-through cooling systems can be close-looped and make appropriate changes.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
For plants that condense whey, evaluate the feasibility of using condensate of whey (COW) water for the first rinse for clean-in-place (CIP) systems and for boiler makeup water.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of using cheese brine for road deicer and implement if found to be feasible.	Road salt applicators contacted with dates and requirements, who contacted at DNR and associated requirements. Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of membrane filtration for reconditioning the brine so that it can be reused.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of using a no-brine making procedure in which salt is added directly to curd during the manufacturing procedure, thereby reducing salt discharges from spent brines.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.

Table 13. Cl Vegetable Processing Industry SRM Actions

VEGETABLE PROCESSING Industry - ACTIONS	REPORT OUT/METRIC
Evaluate the feasibility of reusing once-through cooling water as boiler make-up.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Investigate the feasibility of using unsoftened water for container fill.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of eliminating brine flotation for quality grading, if applicable.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of installing a closed-loop system for cooling water.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.

Table 14. Cl Meat Processing Industry SRM Actions

MEAT PROCESSING Industry - ACTIONS	REPORT OUT/METRIC
Investigate the feasibility of replacing brine chills with air, water, or air-water chills.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Reduce drain back through operational and equipment improvements.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.
Evaluate the feasibility of reusing once-through cooling water or installing a closed-loop cooling water system.	Provide a detailed description of costs, other barriers, why feasible/infeasible, and a plan to change (if feasible) with timeline.

Section 4.02: Mercury

Mercury is released into the environment from both natural (volcanic activity, weathering of rocks, or forest fires) and human-caused sources. While fuel combustion is one of the largest sources of mercury released into the atmosphere, mercury is also released into the environment from manufacturing processes and products, improper disposal of mercury containing devices, and breakage or spillage during use.

In November 2002, DNR began to implement an approach under the WPDES program for mercury that acknowledges the special challenges with regulating a substance that causes environmental impacts at such low levels. Section 106.145, Wis. Adm. Code, provides the main framework for that regulatory approach and is sometimes referred to as the Wisconsin WPDES Mercury Rule. Under this rule, permittees may be eligible for alternative mercury effluent limitations otherwise known as interim limitations (which constitutes a variance to water quality standards) under the condition that the permittee implement a pollutant minimization program (PMP).

Municipal WWTFs

Municipal treatment plants typically remove 90% or more of the mercury entering the plant, but even this high removal rate is generally not sufficient for the plant effluent to consistently meet the very low water-quality based limit of 1.3 ng/L. The goal of a mercury pollutant minimization program (PMP) is to achieve and maintain municipal wastewater treatment plant mercury discharges below 1.3 ng/L by reducing or eliminating mercury discharges from users of the sanitary sewer system.

Wisconsin's Dental Rule

Wisconsin's Dental Office category regulation became effective on May 10, 2022 as Chapter NR 229, Wis. Adm. Code. The State rule was created in response to the 2017 EPA promulgated pretreatment standards to reduce discharges of mercury from dental offices into publicly owned treatment works (POTWs). The Dental Office Category regulation is codified at 40 CFR Part 441.

- Ensure the removal of dental amalgam solids from all amalgam process wastewater via amalgam separator(s) or equivalent device(s) that meet the standard of the final rule. See s. NR 229.03(2)(a-b), Wis. Adm. Code, for an existing source and s. NR 229.04, Wis. Adm. Code for a new source.
- Implementation of two best management practices. See s. NR 229.03, Wis. Adm. Code, for an existing sources and s. NR 229.04, Wis. Adm. Code, for a new source.
- Comply with reporting requirements. See s. NR 229.05 (1), Wis. Adm. Code.
- Maintain and make available for inspection certain records documenting compliance. See s. NR 229.05 (1), Wis. Adm. Code.

Dental dischargers (under any ownership) that were discharging into POTWs prior to July 14, 2017 ("existing sources"), were required to comply with the standards by July 14, 2020. New sources must comply immediately.

In 2006, through funding from EPA, WDNR (in partnership with the City of Superior Wastewater Division, Recycling Connections Corporation, and the Wisconsin Mercury Reduction Committee), developed a detailed guidance document focusing on source identification and minimization for municipalities. The resulting document can be found at: Mercury Pollutant Minimization Program Guidance Manual For Municipalities. The referenced guidance includes two general categories of mercury PMP actions: source reduction identification and reducing sources of mercury. As municipalities implemented effective pollutant minimization efforts, a third category of "maintenance activities" was introduced. The following tables include general actions that municipalities may select as part of PMP development. Depending on the overall success of a currently implemented PMP plan (i.e., effluent concentrations, sector reductions, etc.) additional actions may be necessary beyond these "maintenance" actions. Associated reporting or metrics that could be included in an annual report are imbedded within the PMP action itself. It is highly encouraged that permittees discuss a Mercury PMP plan with the Department prior to submission.

Table 15. Hg Baseline Maintenance PMP Activities

BASELINE - MAINTENANCE ACTION	ADDITIONAL ACTION
Continue to conduct and make public aware of hazardous waste disposal ("Clean Sweep") events.	Conduct and make public aware of annual hazardous waste disposal ("Clean Sweep") events. Include detailed write up of how this was conducted in annual report.
Continue to annually review safety data sheets for all chemicals used in the WWTF to determine if any may contain mercury. Evaluate potential substitutes for any chemicals determined to potentially contain mercury.	Conduct an inventory of all chemicals used at the WWTF and evaluate whether any may contain mercury. Evaluate the potential of substitutions for any chemicals determined to contain mercury.

Continue to maintain actions taken during previous permit term.	Summarize ongoing activities in annual report.
Conduct all influent, effluent, and biosolids monitoring required in the WPDES permit.	Include all data in annual report. Submit annual reports to WDNR on time.

Table 16. Hg Source ID PMP Activities

SOURCE ID ACTIVITIES - MAINTENANCE ACTION	ADDITIONAL ACTION
Continue to monitor the collection system at the frequency specified in the facility's collection system monitoring program.	Develop and implement a mercury monitoring program for the collection system to identify areas contributing higher levels of mercury to the facility. Include a description of the collection system monitoring program methods, all data collected, and all data analysis conducted in annual report.
Assess the effectiveness of previous source reduction measures taken to reduce mercury sources and evaluate whether additional mercury reductions are achievable. Evaluate more recent collection system monitoring data to identify additional hot spots.	Investigate hot spots identified in subsewershed mercury monitoring program to determine mercury sources in that area. For each identified source, identify and evaluate potential measures to reduce mercury from that source. Implement the feasible measures expected to achieve the greatest mercury reductions from each source.
Conduct monitoring of plant side streams (i.e., hauled in wastes, and solids handling return flows).	Develop and implement an updated solids control plan to minimize the amount of mercury that is mobile throughout the system.

Table 17. Hg Inventory Management PMP Actions

INVENTORY MANAGEMENT - MAINTENANCE ACTION	ADDITIONAL ACTION
Maintain current inventory of known mercury sources.	Provide facility inventory in adjacent cell or in a separate attachment along with information about each facility's current mercury reduction practices.
Continue current outreach and education for identified facilities.	Conduct annual meetings with each facility identified in inventory to evaluate mercury contribution to the WWTF. For facilities contributing mercury to the WWTF, discuss and evaluate potential mercury reduction practices. Summarize the results of these meetings in each annual report.

Table 18. Hg Major Sector Specific PMP Actions

MAJOR SECTORS SPECIFIC - MAINTENANCE ACTION	ADDITIONAL ACTION

Continue to maintain and update the inventory of medical and veterinarian facilities and conduct annual outreach to ensure that BMPs are properly maintained. Contact any new medical and veterinarian facilities to discuss the implementation and maintenance of mercury BMPs.	Contact any medical/veterinarian facilities not currently implementing BMPs to encourage the implementation as soon as feasible. Consider the adoption of a sewer use ordinance. Continue to maintain and update the inventory of medical and veterinarian facilities and conduct annual outreach to ensure that BMPs are properly maintained. Contact any new medical and veterinarian facilities to discuss the implementation and maintenance of mercury BMPs.
Continue to maintain and update the inventory of dental facilities and conduct annual outreach to ensure that amalgam separators are properly maintained, and trapped mercury is disposed of properly. Contact any new dental facilities to discuss the implementation and maintenance of amalgam separators.	Contact any dental facilities that have not installed amalgam separators or that have not conducted required maintenance to work toward 100% installation and maintenance of amalgam separators as soon as feasible. Consider the adoption of a sewer use ordinance. Continue to maintain and update the inventory of dental facilities and conduct annual outreach and site visits to ensure that amalgam separators are properly maintained. Contact any new dental facilities to discuss the implementation and maintenance of mercury BMPs.
Continue to maintain and update the inventory of school and educational facilities and conduct annual outreach to ensure that BMPs are properly maintained. Contact any new school and educational facilities to discuss the implementation and maintenance of mercury BMPs.	Contact any school/educational facilities not currently implementing BMPs to encourage the implementation as soon as feasible. Consider the adoption of a sewer use ordinance. Continue to maintain and update the inventory of school and educational facilities and conduct annual outreach to ensure that BMPs are properly maintained. Contact any new school and educational facilities to discuss the implementation and maintenance of mercury BMPs.
Continue to maintain and update the inventory of industrial facilities and conduct annual outreach to ensure that BMPs are properly maintained. Meet annually with identified industrial facilities to discuss additional opportunities to reduce mercury from those facilities and evaluate any identified options for implementation. Contact any new industrial facilities to discuss the implementation and maintenance of mercury BMPs.	Contact any industrial facilities not currently implementing BMPs to encourage the implementation as soon as feasible. Conduct monitoring at each identified industrial facility to determine each facility's mercury loading to the WWTF. Consider the adoption of a sewer use ordinance. Continue to maintain and update the inventory of industrial facilities and conduct annual outreach to ensure that BMPs are properly maintained. Contact any new industrial facilities to discuss the implementation and maintenance of mercury BMPs.

Table 19. Hg Minor Sector Specific PMP Actions

MINOR SECTORS SPECIFIC - MAINTENANCE ACTION	ADDITIONAL ACTION
Continue to maintain actions taken during previous permit term.	Collect and recycle mercury thermostats. Work with retailers, wholesalers, and contractors to complete action.
Continue to maintain actions taken during previous permit term.	Remove and recycle auto mercury switches. Work with dealerships and auto-scrap yards to complete this action.
Continue to maintain actions taken during previous permit term.	Increase business and household use of energy-efficient low-mercury fluorescent bulbs and recycling (rather than discarding) burned out fluorescent bulbs.
Continue to maintain actions taken during previous permit term.	Record and establish which outreach activities have been completed within each sector and record accomplishments within each sector.
Continue to maintain actions taken during previous permit term.	Work outside of your jurisdictional area to reduce mercury loadings and record what actions were completed.

Industrial Dischargers

Pulp and paper mills and coal power plants are the two main industrial sectors that hold WQS variances for mercury in Wisconsin. The following tables describe PMP actions typically implemented by these industrial dischargers.

BASELINE ACTION	ADDITIONAL ACTION
Conduct a mass balance of mercury coming into and leaving the facility.	Update when changes occur.
Inventory all mercury containing devices such as switches, thermostats, etc. and label mercury containing devices to recycle at the end of life. Develop a plan to phase-out mercury-containing devices.	Establish annual metrics to ensure progress. No additional action once plan is executed and all mercury-containing devices are removed.
Inventory mercury containing lab chemicals and implement a chemical management program that includes pre-purchase review and approval.	Request certificates of analysis for bulk chemicals known to have potential mercury contamination and reduce the use of mercury containing chemicals as much as feasible.
Establish mercury management protocols for safe handling, mercury spill clean-up procedures, disposal procedures, and education and training of employees about these protocols.	Conduct reoccurring trainings.
Implement a program to recycle fluorescent lamps.	No additional maintenance action needed once fluorescent lamps are substituted.

BASELINE ACTION	ADDITIONAL ACTION
Institute a program for the proper recovery and recycling of elemental mercury and mercury containing products.	Track recovery amounts and remove from mercury containing device product inventory.
Develop and implement a sampling plan to collect samples at several points throughout the process to pinpoint potential mercury sources within the process.	Develop plan to mitigate mercury sources and clean system downstream. Continue sampling program to demonstrate effectiveness.
Assess and inventory raw materials for possible mercury contamination. Investigate alternative sources and reduce or eliminate mercury containing product through material substitution.	Establish annual metrics to ensure progress. Reevaluate as new technology emerges, and alternative sources become available.

Section 4.03: Phosphorus

Phosphorus is naturally occurring in the environment and may originate from nonpoint sources as well as point sources. As the limiting nutrient for most freshwater systems, additional phosphorus can cause algal blooms, nuisance aquatic plant growth, and eutrophication of waterways.

Agricultural runoff has been documented as a major source of phosphorus in many of Wisconsin's river systems. Other nonpoint sources of phosphorus include urban stormwater runoff and direct deposition of airborne soil particulate. Natural sources include overland flow through wetlands, forests, and other land cover types. Streambank and shoreline erosion may be caused by either natural or anthropogenic factors and is also a source of phosphorus for many waterways. Point sources of phosphorus include municipal WWTFs and industrial discharges, and smaller point sources like failing septic systems, leaking sewer lines, or leakage or spills from storage tanks.

Influent to municipal or industrial treatment facilities is subject to various sources of phosphorus in wastewater, which may or may not be immediately evident to facility managers. Many industries handle materials or use processes that contain phosphorus, which may enter a wastewater stream. Municipal WWTFs will see a baseline level of phosphorus in influent from human waste, however many other possible sources exist, which are discussed in detail below.

Compliance Options and Permitting Approach

Prior to numeric phosphorus criteria and resulting low-level phosphorus limits, brick and mortar construction at a treatment plant was typically the only way to comply with effluent limits. However, with phosphorus WQBELs, WPDES permittees have compliance options available including water quality trading and adaptive management. Phosphorus PMP Plans may specify actions that will result in nonpoint source reductions in phosphorus to the facility's receiving water. These actions may work cumulatively towards realizing water quality trading or adaptive management as a way to comply with phosphorus WQBELs. For more information on these options, refer to the following:

Water Quality Trading:
https://dnr.wisconsin.gov/topic/Wastewater/WaterQualityTrading.html

Adaptive Management:
https://dnr.wisconsin.gov/topic/Wastewater/AdaptiveManagement.html

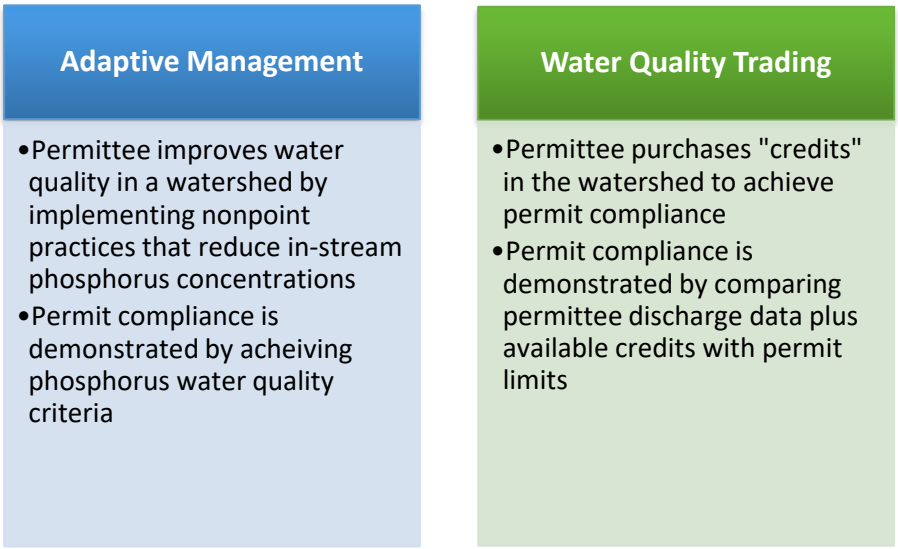


Figure 10. Adaptive Management vs. Water Quality Trading

Permittees that choose to pursue a phosphorus variance will need to consider not only the variety of phosphorus sources at play, but also multiple compliance options. Evaluating the current feasibility of an alternative compliance option will be an important step in determining the need for a variance. The planning documents submitted during the initial phosphorus compliance schedule may be used to help support this need. For municipal (non-industrial) entities a comprehensive facility plan would be ideal in helping to identify the overall needs of the plant, final phosphorus compliance alternatives, and potential upgrades as part of a variance. A facility plan may help set a facility up for success in the long run. Actions implemented over the variance term may be oriented towards making alternative compliance options feasible. To that end, variance actions should follow a logical progression, building upon themselves and/or removing barriers to compliance until final compliance is feasible and the variance is no longer needed.

Variance Options - Multi-Discharger Variance (MDV) or Individual Phosphorus Variance (IPV)

Wisconsin has worked to develop another variance option for dischargers who are unable to meet phosphorus limits. Section 283.16, Wis. Stats., became effective in 2013, establishing the statutory framework for a phosphorus MDV. The MDV is for eligible facilities in which variance and HAC requirements are predetermined; a facility must meet set interim limits for phosphorus and contribute to watershed phosphorus reductions. PMP Plan development is not required for facilities seeking coverage under the MDV. Additional information pertaining to the MDV is available at: http://dnr.wi.gov/topic/wastewater/phosphorus/statewidevariance.html.

When a facility is not eligible for coverage under the phosphorus MDV, an individual variance may be applicable (see Section 2.02). Individual variances provide greater flexibility for eligible dischargers.

Common Sources of Phosphorus – Municipal WWTFs

Phosphorus is present in most wastewater streams. Municipal POTWs treating domestic waste will typically see influent phosphorus concentrations between 3 mg/L and 7 mg/L, depending on multiple factors.

Inflow and Infiltration (I/I)

When sewer pipes, manholes, or other components of the collection system develop leaks, shallow ground water and/or surface water may enter the system during wet weather periods. The main challenge associated with excessive I/I is flow volume. Peaking flows may compromise the plant's treatment processes, put a strain on equipment and operators, or overwhelm the plant's capacity. The quality of I/I may also affect pollutant loading to the facility. While most I/I is often referred to as "clear water", pollutants, including phosphorus, may be present in I/I and contribute to limit exceedances.

The urban environment may present several controllable sources of I/I phosphorus. Pet waste, particularly in high-use areas where the site is poorly managed, may result in additional loading of phosphorus via I/I. Leaf litter and other organic material from the landscape may contribute, as could runoff from lawns, if fertilizer has recently been applied. A community may wish to implement changes in land management within its service area to improve the quality of I/I. This effort is most applicable when a known problem area of the collection system overlaps with a known source type outlined above. Collection system management is typically an ongoing effort for municipalities. Repair of leaking collection system components should be prioritized as much as possible under the facility's Capacity, Management, Operations, and Maintenance (CMOM) program.

Residential

Domestic waste originates as human waste and grey water (wash water) which may be strengthened by other organic material disposed of via a home's sewer connection. Common sources of organic material include in-sink food disposals and liquid food or cooking products which may be washed down the drain. Detergents containing high amounts of phosphorus are generally no longer used in household products, though may still be used in niche or hobby activities. Phosphate-based water POE conditioning systems are available to consumers but are not thought to be widespread.

Education and outreach activities are the most commonly employed mechanism to reduce phosphorus contributions from households. Formal prohibitions on items such as in-sink food disposals or phosphate-based water conditioning systems may be an option as well, however, the enforceability of such measures must be considered when evaluating options.

Phosphorus-based additives for municipal drinking water conditioning to prevent corrosion, specifically orthophosphates and polyphosphates, are still in use throughout Wisconsin. For more information on these additives, refer to Section 4.04, page 108 of Guidance for Implementation of Wisconsin's Phosphorus Water Quality Standards for Point Source Dischargers. At this time, communities are not required to implement alternative drinking water additives if it could jeopardize the safety of drinking water.

Commercial

Commercial contributors to the collection system may increase phosphorus concentrations of influent beyond the typical ranges mentioned above. Nearly all municipalities have some amount of commercial sewer use. For small WWTFs, working closely with a limited number of commercial entities may result in measurable reductions in influent phosphorus. For larger communities, a more systematic approach may be required to interface with commercial entities.

Laundromats and other commercial cleaners may discharge higher strength wastewater if phosphorus-containing cleaning agents are used. The two most common phosphorus-based chemicals used in cleaning products are trisodium phosphate and phosphoric acid. In many instances, these may be replaced with phosphorus-free or low-phosphorus alternatives without a loss in cleaning performance. Institutions that employ janitorial services may also present opportunities for reducing phosphorus loading through alternative cleaning product selection.

Restaurants have the potential to contribute to phosphorus loading through cleaning agents and food waste. These sources often have solutions that can be readily implemented, such as use of alternative cleaning products and better food waste management. Municipalities could consider offering a composting program for food waste to keep this organic material out of the WWTF's influent.

Vehicle washing stations that discharge to the sanitary sewer can contribute to phosphorus loading if cleaning agents containing the phosphorus-based compounds discussed above are used.

Industrial

Industrial contributors to the collection system may serve as major sources of influent phosphorus. As discussed below, the properties of wastewater will vary depending on industry type. Industries that send some or all of their wastewater to the municipal WWTF have the potential to influence phosphorus treatment required at the WWTF. Therefore, each of the industrial categories discussed below may be relevant to municipal facilities. Those facilities with industrial pretreatment programs will likely have existing information on industrial phosphorus contributions. If this information is not currently available, it should be obtained via a PMP action. Steps taken to investigate industrial contributors may entail an inventory of businesses within the sewer service area, a review of water sales to industrial entities that have a sewer connection, and direct contact with those entities. See Appendix F for specific actions.

Cheese Manufacturers and other dairy industries often have multiple waste streams that contain moderate to high concentrations of phosphorus, primarily from milk. One of the largest sources of dairy wastewater is the wash water and rinse water of dairy tanks, trucks, equipment, pipelines, and floors. Accordingly, the volume of wastewater produced by a dairy operation can vary greatly over a 24-hour period. Therefore, the collection and equalization of dairy wastewater is very important so that the flow and pollutant discharges to the collection system are more uniform. Cleaning agents may also play a role in phosphorus loading and the likelihood of a plant upset. Sometimes dairy wastes require pretreatment before discharge to a sanitary sewer. A treatment plant can be upset if it receives variable loads, high-strength wastes, high or low pH discharges, or slug loads from a dairy facility.

USDA-NRCS Technical Standard 629- Waste Treatment cites an average milk wash water total phosphorus concentration of 175 mg/L. When product is lost to cleaning operations, this not only results in less efficient production, but more phosphorus must be removed from the wastewater. Consider adopting measures that minimize the amount of product carried away in wash water. Purging lines with air (rather than rinse water) is an option, as is changing cleaning techniques to concentrate lost product in a side stream that is not wastewater (such as composting, land spreading, or alternative uses).

Metal plating and metal phosphatizing operations commonly employ phosphorus-based products to treat metal surfaces. Phosphorus is discharged with rinse water or when a batch of solution is disposed of. Several steps can be taken to reduce the amount of phosphorus discharged, including more frequent rinse phases to maintain solution quality, better capture, and reuse of any bath overflows, and minimizing solution carryover via adequate part drainage. If phosphoric acid is used to maintain solution pH, investigate alternative acids that will achieve similar results. Optimize processes to use less water, or less input chemical as able.

Fruit and vegetable producers often require phosphorus removal at the facility due to product and equipment washing. As discussed above, phosphorus-containing cleaning agents should be eliminated or minimized. Equipment cleaning practices can often be optimized so that less water is used, and less organic material enters the waste stream.

Meat packing and processing plants often use high volumes of water to ensure a well-rinsed product that complies with USDA food safety regulations. There may be opportunities to reduce water use, including fixing leaks and shutting off water-using equipment when not in use. Consider alternative means to move waste materials throughout the facility, such as replacing troughs with conveyer belts or vacuum systems. Segregating organic waste and routing waste to other uses may reduce the overall load of phosphorus to the WWTF.

Breweries may present opportunities for phosphorus reduction. The spent yeasts and grains used in the brewing process will generally be discharged to the municipal sewer system if there is no local, dedicated treatment facility. Brewery waste has been documented to range from 1 – 50 mg/L total phosphorus. The brewing ingredients, along with cleaning agents and washing operations similar to other categories discussed above, have the potential to result in large pulse loads of flow and pollutants to the WWTF. Therefore, the collection and equalization of brewery wastewater can reduce impacts to the downstream WWTF.

Nonpoint Sources of Phosphorus

Though not a direct source to a collection system, as stated above, phosphorus in a receiving water body may originate from nonpoint sources as well as point sources. As such, these sources of phosphorus are important to consider when planning a variance approach and an ultimate compliance alternative. WQBELs for phosphorus are calculated based on the available assimilative capacity of the receiving water, and therefore are impacted by any source of phosphorus within that receiving water body. Reductions in nonpoint source phosphorus may eventually result in water quality improvements and a recalculated WQBEL for phosphorus. In addition to the broad goal of the receiving water meeting the

phosphorus standard, PMP plans may consider nonpoint source reductions within the variance term as a means to satisfy highest attainable condition requirements. Therefore, facilities that have limited options for improving phosphorus treatment should consider nonpoint source reductions of phosphorus as a component to the PMP plan. See Appendix F for a more complete list of PMP plan actions for nonpoint source reductions.

A facility may work over the course of multiple variance terms to build a portfolio of nonpoint source reduction projects. The long-term goal may be to achieve sufficient reductions to facilitate compliance via water quality trading. It is strongly recommended that all nonpoint source reductions implemented under a PMP are supported by a binding, written agreement that will support future water quality trading under s. 283.84(1) Wis. Stats. Annual reports submitted as part of the variance should also contain quantification information for DNR's review and concurrence. For more information, reference Guidance for Implementing Water Quality Trading in WPDES Permits.

There are multiple phases to implementing a nonpoint phosphorus reduction program, each of which may be reflected as categories of actions within the PMP plan. Preliminary steps involve establishing partnerships with entities that commonly work in the agricultural or land management realm, identifying the applicable hydrologic area for trading, and budgeting for future projects. Efforts may progress to meeting with landowners, quantifying nonpoint phosphorus loading from one or more sites, and coordinating contracting and construction activities.

Facility Types and Phosphorus Variance Approach

As stated above, phosphorus as a variance pollutant is unique because traditional treatment technology is available to achieve a certain level of treatment. The ability for traditional treatment to be installed at a treatment plant will affect the overall requirements and PMP plan of an IPV. If treatment to meet the final WQBEL is not feasible, the permittee may still be required to install treatment to achieve a feasible reduction of effluent phosphorus. While the specific PMP plan actions may vary from facility to facility, all facilities must implement the PMP plan actions expected to achieve the greatest pollutant reduction/environmental outcome. The following discussion of facility types and final compliance approaches is intended to help guide early decision making when investigating PMP actions. More details regarding specific PMP plan items are available in Appendix F – Phosphorus PMP plan Checklist.

1. Aerated Lagoon Systems

An aerated lagoon is a treatment pond with mechanical aeration used to introduce oxygen into the pond in order to promote the biological oxidation of the wastewater. Operators utilize oxygen and microbial action in lagoons to treat the pollutants in the wastewater. Lagoon depths range from 10 to 15 ft. Lagoon treatment systems have long been employed to provide primary treatment of sewage for smaller communities. In Wisconsin, lagoons and other small discharges have not historically been subject to phosphorus TBELs if average phosphorus discharge was less than 150 lbs/month for municipal facilities, or less than 60 lbs/month for industrial facilities. Lagoon facilities with no previously applicable phosphorus limit may not currently have means to remove phosphorus from the waste stream.

It has been demonstrated that adding metal salts (e.g., ferric chloride, ferrous sulfate, alum) or other unique chemicals (i.e., Poly Aluminum chloride (PAC) or rare earth chemicals) to lagoons can achieve effluent phosphorus concentrations below 1.0 mg/L. For continuous dosing, metal salts to remove phosphorus are usually added to the last pond or lagoon where the precipitation reaction and settling can occur. The chemical should be added where good mixing of the chemical with the wastewater can be achieved, such as an upstream manhole prior to the last pond or just before an aerator. For batch dosing of aluminum sulfate (alum) in fill and draw systems, some operators use a small motorboat to apply the alum (more description in the stabilization pond section). Another alternative is to spray alum directly on the surface.

Optimization and Compliance Approach

While substantial phosphorus removal can be achieved via chemical addition, it is unlikely that lagoon systems will readily meet more stringent phosphorus WQBELs. Facilities with very low limits may ultimately plan on achieving compliance via alternative means such as adaptive management or water quality trading, perhaps in lieu of, or in combination with, addition of treatment chemicals. A PMP plan may focus on searching for trading partners, though a focus on additional effluent phosphorus reductions may also be required as part of the PMP plan. Removing phosphorus from the waste stream via chemical addition could result in more easily attainable trading or adaptive management solutions due to the need to offset less mass of phosphorus. Additionally, reduced effluent phosphorus concentrations contribute to highest attainable condition (see Section 1.02).

Small improvements to the lagoon's phosphorus removal efficacy can be achieved in several ways. Ensuring adequate depth is a basic task that should not be overlooked. Solids that accumulate at the bottom of the lagoon will reduce depth and hydraulic retention time. Using a depth measurement device throughout the lagoon will give a baseline reading. Sludge removal should be prioritized when depths are reduced below the specified range. EPA has made available a number of optimization resources via a technical assistance webinar series. These webinars focus on improving NPDES compliance for small POTWs. A lagoon-specific optimization webinar is available at:

https://www.epa.gov/compliance/optimizing-performance-aerated-wastewater-lagoon-systems-part-2

2. Stabilization Ponds

Stabilization ponds have historically been used to provide long detention times (greater than 150 days) for wastewater to be stabilized through natural processes. Wastewater is treated by the action of bacteria (both aerobic and anaerobic), algae, other micro and macro-organisms, and by the physical process of gravity settling. When properly designed, ponds are capable of providing secondary treatment for both BOD and suspended solids. Pond depths range from 3 to 6 ft. This process is much slower than mechanical plants. For example, a stabilization pond takes at least 150 days to achieve satisfactory treatment.

As stated above in the aerated lagoon section, adding metal salts or other chemicals to lagoons can achieve effluent phosphorus concentrations below 1.0 mg/L. The phosphorus removal chemical used at stabilization ponds is typically alum, and it is commonly applied to the pond by boat. The boat is fitted with a tank to hold the chemical. The chemical drains by gravity to the propeller area where it is mixed

into the pond. The boat travels and applies chemical in a grid work pattern across the entire pond surface. The floc that forms is allowed to settle for 24 to 48 hours, and a sample of the treated pond is taken to assure it meets effluent limits before the pond is discharged. This can be an inexpensive and effective method to treat and remove phosphorus from ponds and lagoons. Care must be taken in shallow ponds when boat propellers are used for mixing so as to not disturb the solids settled in the pond or damage the liner.

Solids will accumulate in the pond where precipitates form and settle. The amount of chemical sludge produced is 7.5 mg chemical sludge per mg phosphorus removed for alum and 10 mg chemical sludge per mg phosphorus removed for ferric/ferrous chemicals. Sludge depths should be measured annually, and sludge removed as needed to avoid any release of the phosphorus from the settled sludge and organic material.

Optimization and Compliance Approach

Similar to lagoon systems, stabilization ponds are unlikely to achieve low-level WQBELs for phosphorus, but are likely to achieve phosphorus effluent reduction from the application of metal salts. Similar approaches to chemical addition can be used as with aerated lagoons. However, stabilization ponds do have some additional flexibility regarding discharge rates and may be able to switch to a fill and draw type operation. This would allow for batch application of chemical before discharge and reduce discharge to only a few times per year when effluent quality is at its highest.

Other operational or community efforts can contribute to lowered phosphorus discharges. Reducing influent phosphorus at its source via a community outreach or ordinance approach may be effective, and collection system improvements are likely to reduce phosphorus effluent levels, especially when evaluated on a mass-basis. In plant, sludge management and sludge removal may provide better settling and reduced solids in the effluent. Control of any algae blooms that occur immediately before or during discharge may also reduce nutrients in the effluent.

3. Mechanical Treatment

There are many types of mechanical wastewater treatment systems. Mechanical treatment, in general, involves constructed tankage or channels that may be fitted with different mechanical processes such as influent screening, aeration, and sludge management. There are numerous options for phosphorus removal at mechanical plants, including optimization of existing treatment and introduction or enhancement of chemical and biological phosphorus removal.

Enhanced biological phosphorus removal (EPBR) treatment processes may achieve low-level phosphorus WQBELs. Some of the more common types are anaerobic/anoxic/oxic (A2/O), modified Bardenpho, University of Cape Town (UCT and modified UCT), and various oxidation ditch designs. While some are complicated, all employ the basic theory and principles of EBPR design: an anaerobic zone for phosphorus accumulating organisms (PAOs) selection and the release of phosphorus, anoxic zones for nitrate control, and aerobic zones for surplus phosphorus uptake.

Chemical phosphorus removal (CPR) is also considered one of the most traditional forms of phosphorus treatment. By adding metal salts (e.g., ferric chloride, ferrous sulfate, alum) or other unique chemicals to

various locations within the plant with adequate mixing, precipitation of phosphorus takes place and is then removed within the solids separation process of the wastewater treatment plant.

Optimization and Compliance Approach

Mechanical plants may be able to meet phosphorus WQBELs depending on how stringent the limit is, and how effective the biological and/or chemical process is at removing phosphorus. For mechanical facilities, upgrades to meet a phosphorus limit may be more readily achievable and affordable than for other facility types.

Optimization efforts are critical to ensure that current treatment is operating to the best of its abilities. Whether or not a facility is utilizing biological or chemical treatment processes will ultimately decide which optimization measures are taken. Dosage rates, chemical feed locations, hydraulic retention times, supplementary carbon source, digester decant operation, and in-line monitoring are all minor optimization actions that mechanical plants could investigate. Biological phosphorus removal followed by chemical phosphorus removal may be a viable option for meeting WQBELs in the range of 0.3 – 0.5 mg/L, or lower depending on site-specific factors. Optimization efforts and reducing effluent phosphorus results will help in making alternative compliance options more realistic.

4. *Recirculating Sand Filters (RSF)*

Recirculating sand filters have been installed in small communities due to the higher degree of treatment achieved when compared to ponds or lagoons. An RSF, also known as a recirculating media filter, is a type of secondary treatment. Secondary treatment provides a high level of removal of biodegradable organic pollutants to protect receiving water quality that clarification alone cannot provide. RSFs should be used only for residential strength waste and is most applicable to small rural communities. High-strength wastes from commercial or industrial users may cause organic overloading, in turn causing fouling of the filter media, leading to ponding, and clogging of the distribution piping. High-strength waste may also cause the loss of treatment within the system.

Recirculating media filters are an aerobic, attached growth, secondary treatment unit following primary treatment utilizing aerobic microorganisms that grow on the filter media. The treatment process is a combination of biological decomposition, biochemical conversions, and filtration. The filter media serves as a structure to support microbiological growth.

Despite their advantages, recirculating sand filters offer very little in terms of phosphorus removal. It may be possible to remove phosphorus during a treatment process ahead of or following the sand filter. However, addition of chemical salts ahead of a sand filter is discouraged due to the risks associated with increased solids entering the filter, clogging it, and compromising any treatment abilities of the system. If this occurs, the filter media must be replaced, which is a costly process.

Compliance Approach

In general, it is not expected that facilities that employ RSFs will remove phosphorus in-plant. Source reduction measures or operational changes may help. Though not thought of as traditional SRMs, basic maintenance practices of solids removal or weed control, may improve the overall treatment of the RSF, thus reducing phosphorus (and other pollutants) being discharged.

The septic tanks prior to the filters should have the solids removed frequently to improve capacity and settling time. Regular removal may also help to prevent release of phosphorus due to anaerobic conditions within the built-up solids. Additionally, removal of weeds within the filters (recommended by hand) prevents organic material from entering the system and clogging the filters and lowering treatment capabilities. Communities that currently employ RSFs will need to consider replacing the treatment process to achieve compliance with low phosphorus WQBELs. Achieving compliance via water quality trading may be the most economical option in some cases if it would allow the phosphorus WQBEL to be met without a major facility upgrade. Refer to "Nonpoint Sources of Phosphorus" earlier in this chapter, and appendix F for the water quality trading priority initiatives.

Section 4.04: Other Pollutants (Arsenic, Copper, Lead, Zinc)

Chapter NR 105, Wis. Adm. Code, specifies acute and chronic surface water criteria related to water quality criteria for toxic and organoleptic substances. This includes criteria for the heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc), which facilities typically monitor at least once per permit term. The metals that most often trigger the need for a limit in WPDES permits are: arsenic, copper, lead, mercury, and zinc. Mercury is covered in Section 4.02 and is not further addressed in this section. The other four parameters are discussed in this section. Facilities applying for variances to these parameters should reach out to department staff early on in the permit application process.

Common Sources of Metals – Municipal WWTFs

Metals are present in most wastewater streams in low concentrations; however, influent source water, additives, or industrial contributions can increase concentrations in wastewater. Fewer facilities have historically requested variances for metals and therefore the list of known potential sources and control measures in this section is shorter compared to those in Sections 4.01-4.03. Often sources that contain one of these metals will contain them all. Therefore, in most cases, controlling one contributing source will address the three metals most commonly found at levels of concern in wastewater (copper, lead, and zinc). Arsenic on the other hand, tends to be present at levels of concern due to intake surface water, due to unique industrial contributors, or naturally occurring in the groundwater source. Therefore, SRMs identified for the three other metals may not address arsenic sources.

Residential and Commercial

In general, domestic wastewater is low in metal concentrations, however, corrosion of the conveyance system can lead to leaching of copper or lead from pipes into the wastewater. High levels of total dissolved solids (TDS), too high or too low pH, or high levels of hydrogen sulfide can lead to corrosion of the pipes.

By controlling the environment within the collection system, either by adding polyphosphates as corrosion control, adding chemicals to prevent sulfide production, or replacing lead and copper equipment (e.g., pipes, fixtures, faucets) all together, may reduce the influent sources of heavy metals.

Chemical root removal can be a source of copper in wastewater influents, as copper sulfate is a common product used by both utilities and homeowners. Mechanical removal and general collection system

maintenance are preferred methods for reducing root growth because they do not introduce copper into the system.

Source waters should be investigated in cases where arsenic is a concern because intake waters (both surface and groundwaters) from some areas can have high levels of arsenic. If arsenic data from source waters is not currently available, it should be obtained via a PMP action. It may be necessary to treat the source water or relocate the intake to another location, in situations where arsenic is high.

Commercial contributors to the collection system would have the same potential sources as residential.

Industrial

Industrial contributors to the collection system may serve as major sources of influent metals. The industries that most often contribute significant amounts of metals are metal finishers, fabricators/manufacturing, and casting facilities. To help control the indirect discharges from these facilities, chs. NR 221 through NR 297, Wis. Adm. Code, contain pretreatment requirements and limits for these categorical industrial users. If the pretreatment standards are not protective enough for the municipality, it may be necessary to establish more restrictive local pretreatment limits through the sewer use ordinance.

Industries may also discharge metals if additives being used at their facility contain the unwanted pollutant. If the permittee does not have information related to additives being used at their contributing industries, this information should be obtained via a PMP action. Steps taken to investigate industrial contributors may include an inventory of businesses within the sewer service area, a review of water sales to industrial entities that have a sewer connection, and direct contact with those entities.

As stated above, industrial sources of arsenic are unique; the most well-known sources from industries are coal in power plants and RO reject waters. Arsenic amounts in RO reject waters will depend on the source of the intake water. Arsenic concentrations in natural waters typically range between 0.5 µg/L and 10 µg/L. Currently available data on Lake Michigan water suggest that the lake wide concentration is approximately 1.0 µg/L. Once waters are used or concentrated within a system, arsenic can increase to levels of concern.

Glossary

Adaptive Management – An approach to achieving compliance with a water quality standard adopted under s. 281.15, Wis. Stats., or a total maximum daily load under 33 USC 1313 (d) (1) (C) approved by the federal environmental protection agency under which a permittee implements a plan to achieve the water quality standard or total maximum daily load through verifiable reductions in the amount of water pollution from point sources and nonpoint sources, as defined in s. 281.16 (1) (e), Wis. Stats., in a basin or other area specified by the department and uses monitoring data, modeling, and other appropriate information to adjust the plan if needed to achieve compliance.

Antidegradation - Antidegradation requirements provide a framework for maintaining and protecting water quality that has already been achieved. In general, the antidegradation rule language in ch. NR 207, Wis. Adm. Code, is intended to, where appropriate, require a justification of the reasons for new or increased discharges to surface waters before they can be allowed under Wisconsin's discharge permit program (WPDES).

Highest Attainable Condition – A concept from federal regulations (40 CFR 131.14(b)(1)(ii)(A)3) requiring variances to result in the greatest possible pollutant reduction or the best environmental outcome achievable.

Interim Limit – A numeric effluent limitation that at the time the variance is approved represents the level currently achievable by the permittee and that is no less stringent than the effluent limitation achieved under the permit before reissuance. Interim limits are necessary to prevent backsliding and are typically expressed as daily maximum or weekly average concentration limits.

Multiple Discharger Variance – A variance that applies to qualifying municipal and industrial wastewater treatment facilities throughout the state that provides temporary relief from water quality-based limitations. Specific to Wisconsin, s. 283.16, Wis. Stats, refers to a statewide or multi-discharger variance for phosphorus.

Pollutant Minimization Program Plan – A cost effective plan outlining activities a permittee can perform with the goal of reducing all potential sources of a pollutant for the purpose of maintaining the effluent at or below the water quality-based effluent limitation.

Source Reduction Measure – Action(s) taken by a permittee to reduce influent pollutant loadings while working towards achieving compliance with a WQBEL.

Technology-based Effluent Limitation (TBEL) – An effluent limitation established pursuant to ss. 283.13(1) through (4), Wis. Stats, whose aim is to prevent pollution by requiring a minimum level of effluent quality that is attainable using demonstrated technologies for reducing discharges of pollutants.

Total Maximum Daily Load (TMDLs) – The maximum amount of a pollutant a waterbody can receive and still meet applicable water quality standards. TMDLs consider all sources (point and nonpoint) of a

pollutant and pollutant loads are set to achieve in-water targets that must be met for the waterbody to meet water quality standards.

Water Quality-based Effluent Limitation (WQBEL) – An effluent limitation determined by using applicable water quality criteria (e.g., aquatic life, human health, wildlife, translation of narrative criteria) for a specific point source to a specific receiving water for a given pollutant or based on the facility's wasteload allocation from a total maximum daily load (TMDL).

Water Quality Standards – Standards established by the DNR pursuant to s. 281.15, Wis. Stats, for the physical, chemical, and biological characteristics of a water which must be maintained to make it suitable for specified uses. Water quality standards consist of the designated uses of a water body, water quality criteria to protect those designated uses, and antidegradation requirements to protect existing uses and high-quality waters.

Water Quality Standards Variance – A temporary change to a water quality standard.

Water Quality Trading – An approach to achieving compliance with a water quality-based effluent limit under which a permittee implements an approved plan in which "credits" of a certain pollutant is purchased either from a point source or a non-point source. In other words, trading provides point sources with the flexibility to acquire pollutant reductions from other sources in the watershed to offset their point source load so that they will comply with their own permit requirements.

Resources and Quick Links

DNR websites:

- Adaptive Management: https://dnr.wisconsin.gov/topic/Wastewater/AdaptiveManagement.html
- Environmental Loans: https://dnr.wisconsin.gov/aid/EIF.html
- Environmental Loans MHI Data: https://dnr.wisconsin.gov/topic/aid/dataSources.html
- Phosphorus Implementation: https://dnr.wisconsin.gov/topic/Wastewater/Phosphorus
- Phosphorus Multi-Discharger Variance: https://dnr.wisconsin.gov/topic/Wastewater/phosphorus/StatewideVariance.html
- Transport of Salt in Storm Water Runoff: https://dnr.wisconsin.gov/topic/Stormwater/learn_more/salt.html
- Variances to WQS: https://dnr.wi.gov/topic/wastewater/variances.html
- Water Quality Trading: https://dnr.wisconsin.gov/topic/Wastewater/WaterQualityTrading.html

Trainings & Webinars:

- EPA Technical Assistance Webinar Series: Technical Assistance Webinar Series: Improving CWA-NPDES Permit Compliance | US EPA

Guidance and Other Documents:

- Calculating Water Quality-Based Effluent Limitations for Surface Water Discharges: https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=256227403
- Mercury PMP Guidance Manual for Municipalities: https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=186515531
- Phosphorus Operator Certification Study Guide: https://widnr.widen.net/s/jvtdn6lbj2/studyguidephosphorus
- USEPA's Interim Economic Guidance for Water Quality Standards: https://www.epa.gov/wqs-tech/economic-guidance-water-quality-standards

Templates:

- Facility Inputs for Lime Softening Eligibility Calculation: [link to fillable template to be inserted later]
- Phosphorus PMP Checklist: [link to fillable template to be inserted later]
- Source Reduction Measures/Pollutant Minimization Program Plan: [link to fillable template to be inserted later]
- Variance Annual Report Checklist: [link to fillable template to be inserted later]
- Water Softener Survey Template Example: [link to fillable template to be inserted later]
- Water Softener Survey Example Cover Letter: [link to fillable template to be inserted later]

Appendix A – Applicable Administrative Code and Statutes

Several federal and state statutes and regulations govern the variance process. Federal requirements are relevant because variances are considered modifications to water quality standards which require federal approval pursuant to 40 CFR 131.5 and is specifically required for variances under 40 CFR 131.14.

Federal Regulations:

In 2015 EPA published revisions to their water quality standards rules in the Federal Register on August 21, 2015 (80 FR 51019). These federal regulations were promulgated to address changes to water quality standards, designated uses, triennial standards reviews, antidegradation, schedules of compliance, and variances. Part E covers WQS variances. The rule language is on page 51048 and the preamble language is on pages 51035-51041.

The portions of 40 CFR 131 related to establishing water quality standards, including variances, include:

40 CFR 131 Subparts A-C: Requirements for establishing state water quality standards.

40 CFR 131.4: States are responsible for establishing and revising water quality standards. U.S. EPA approves or disapproves standards under 40 CFR s. 131.5.

40 CFR 131.6: Water quality standards consist of designated uses and criteria to protect the designated uses.

40 CFR 131.11: States must adopt water quality criteria that protect designated uses. For waters with multiple uses, the criteria must protect the most sensitive use.

40 CFR 131.14: Authorizes states to adopt water quality standards variances for a permittee or waterbody, subject to EPA approval. An approved water quality standards variance applies for the purposes of developing NPDES permit limits and requirements. This section establishes requirements for adopting variances.

40 CFR 131.20: Revision of state water quality standards is subject to public participation procedures and U.S. EPA review and approval under 40 CFR 131.20.

40 CFR 122.44(d): Provides that water quality based effluent limits (WQBELs) must be derived from and comply with water quality standards and designated uses.

In 1995 EPA published water quality guidance for the Great Lakes System in the Federal Register on March 23, 1995 (60 FR 15387). The Guidance in this part identifies minimum water quality standards, antidegradation policies, and implementation procedures for the Great Lakes System to protect human health, aquatic life, and wildlife. Appendix F, Procedure 2 covers WQS variances. The rule language is on page 15415 and 15416.

40 CFR 132 Appendix F, Procedure 2: Variances from water quality standards for point sources. This provision shall not apply to new Great Lakes dischargers or recommencing dischargers.

Wisconsin Statutes:

Section 281.15, Wis. Stats.: Mandates that the department promulgate water quality standards, including water quality criteria and designated uses. It recognizes that different use categories and criteria are appropriate for different types of waterbodies, and that the department shall establish criteria which are not more stringent than reasonably necessary to ensure attainment of the designated use for the waterbodies in question.

Section 283.15, Wis. Stats.: Establishes a process and requirements for adopting variances to water quality standards.

Section 283.16, Wis. Stats.: Authorizes the state to establish a statewide multi-discharger variance for phosphorus and establishes the procedures for doing so.

Sections 283.31(3), (4), and (5), Wis. Stats.: States that the department may issue a permit upon the condition that the permit contains limitations necessary to comply with any applicable federal law or regulation, state water quality standards, and total maximum daily loads.

Section 283.55, Wis. Stats.: Grants the department authority to impose monitoring and reporting requirements.

Administrative Codes:

Chapter NR 102, Wis. Adm. Code: Defines the designated uses for surface waters and contains narrative standards which prohibit substances in Wisconsin surface waters at concentrations which are toxic or harmful to humans, animals, plants, or other aquatic life. Chapter NR 102 also contains numeric water quality criteria for pH, dissolved oxygen, bacteria, phosphorus, temperature, and preventing objectionable tastes or odors in fish or drinking water.

Chapter NR 103, Wis. Adm. Code: Establishes water quality standards for wetlands.

Chapter NR 104, Wis. Adm. Code: Contains a list of intrastate surface waters that do not support full fish and aquatic life uses, called limited forage fish, and limited aquatic life waters. The chapter contains the water quality criteria and effluent limitations applicable to discharges to these waters for BOD, pH, dissolved oxygen, and total suspended solids. Chapter NR 104 also lists those waters designated as public water supply and interstate waters.

Chapter NR 105, Wis. Adm. Code: Establishes water quality criteria and methods for developing criteria for toxic and organoleptic substances.

Chapter NR 106, Wis. Adm. Code: Contains procedures for calculating WQBELs for toxic and organoleptic substances, including whole effluent toxicity (WET), mercury, chloride, ammonia, and temperature as well as procedures for determining if and how limits should be included in permits. Includes Subchapter III – Effluent Limitations for Mercury Discharges and Subchapter VII – Effluent Limitations for Chloride Discharges.

Chapter NR 200, Wis. Adm. Code: Establishes procedures and requirements for permit and variance applications.

Chapter NR 207, Wis. Adm. Code: Establishes implementation procedures for the department's antidegradation and antibacksliding policies.

Chapter NR 212, Wis. Adm. Code: Establishes the procedures, methodologies, and requirements for determining total maximum daily loads (TMDLs) and corresponding WQBELs.

Chapter NR 217, Wis. Adm. Code: Establishes procedures for calculating technology based effluent limits (TBELs) and WQBELs for phosphorus in wastewaters that are discharged to surface waters as well as procedures for determining if and how limits should be expressed in permits.

Appendix B – SRM/PMP Plan Template

NOTE: This template is provided as a reference and starting point for facilities to use when developing SRM/PMP Plans and is not required to be used.

[**Insert Facility Name**]
Source Reduction Measures/Pollutant Minimization Program Plan
Permit Number: **[Insert Permit No.]**
Date: [**Insert Date**]

Narrative

Depending on the documentation available at the time of variance application, additional narrative may need to be provided in support of selected SRM/PMP actions. In addition to providing background for EPA and DNR, the SRM/PMP narrative will help other readers (municipal or non-governmental) become familiar with the facility planning process and reasoning behind the variance approach. All SRM/PMPs should provide some degree of narrative and address the following topics:

- Is this a new variance or renewal of an existing variance?
- A brief summary of actions taken during the previous permit term and the results of those actions to establish a baseline of what has been done to date.
- A brief discussion on reductions expected with implementation of the proposed SRM/PMP actions.

Source Identification/Mass Balance

Provide a mass balance summary of known and potential sources of the variance pollutant. Information can be presented in any form, but the table below is provided as a template for presenting source information. However, depending on the facility, variance pollutant type, and feasibility of sampling influent sources and applicable outfalls (surface water, land treatment, sludge, etc.) it may be more appropriate to present information in a figure that shows the amount of pollutant coming in versus the amount removed by treatment and going out to surface water.

[Pollutant] Source Category	Annual Average Mass (lbs/day)	Annual Percent of Total
TOTAL		**100%**

Data Analysis

Provide a trend analysis dating back to before the implementation of SRM, PMP, or other variance steps. Include influent and effluent data where available. Reference or attach any facility planning or evaluation study that evaluated facility performance capabilities (only include studies that are recent or otherwise applicable for the evaluation of the existing facility and current conditions). Provide an explanation for any "spikes" in data that may have been observed during the current permit term.

Planned Actions

In the table below, list specifically, what steps the facility plans to undertake (and when) in the next 5-year permit (variance) term to reduce levels of the pollutant to the treatment plant.

SRM/PMP Activities	1st Year	2nd Year	3rd Year	4th Year	5th Year
1.					
a.					
b.					
2.					
a.					
b.					
3.					
a.					
b.					
4.					
a.					
b.					
5.					
6.					

Appendix C – Variance Annual Report Checklist

Section I: General Information

Permittee Name:
Pollutant:
Annual Report Year Covered (i.e., 2018):
Variance Permit Term (i.e., 1st permit with a variance):
Year of Permit (i.e., 1st):

Section II: Summary of Pollutant Reduction Work Done to Date

Pollutant Source Identification

- ☐ List and discuss sources of pollutant. The discussion should include whether the specific source is controllable. If not controllable, include details as to why not.

SRMs/PMPs Completed

- ☐ Discuss the source reduction measures completed during the previous year. It should be identified if this action was to minimize or maintain a pollutant source.
- ☐ For each of the actions, provide a detailed summary* and attach any supplemental information. This could include date/date range of action, copy of meeting minutes, inspection results, rebates, etc.
- ☐ If any actions triggered next steps, these actions should be included along with a planned schedule.

SRMs/PMPs Not Completed

- ☐ Include a list of planned actions for the year, according to the SRM, that were not completed.
- ☐ A detailed explanation* as to why the planned actions were not completed should be included. This could have been due to operator time, funding, or additional barriers.
- ☐ Discuss in detail the encountered barriers that prevented completion of the action items.
- ☐ Along with a new time frame, include steps to ensure planned actions will occur in the future.

* This is the main focus of the report and should clearly reiterate the setbacks to the planned actions.

Section III: Summary of Progress

Data Analysis

- ☐ All data collected for the previous 5 years should be included. This data could include any influent, effluent, blanks, industry, or other sampling performed.

- ☐ Provide data in the following formats:

  ☐Graphs ☐Tables, Averages ☐Raw Data

- ☐ Include an analysis summary of the data. This could include high effluent due to seasonality, industrial loads, or unknown spikes.

Section IV: Planned Actions

SRMs/PMPs Planned

- ☐ List the planned actions for upcoming year, according to the SRM. This list should also include any follow-up/next step actions identified in Section II above.

Section V: Final Report

Only applies to the final annual report prior to permit expiration

- ☐ Next steps pertaining to the permit reissuance should be included. This should be a discussion on the ability to meet the final water quality limit and additional justification for applying for another variance term.

- ☐ Submit a new SRM plan if the facility is planning on applying for another variance term.

Appendix D – Lime Softening Inputs

Facility Inputs for Lime Softening Eligibility Calculation

Facility Name:_____

WPDES Permit No.: _____ **Date:** _____

Values should be provided for all inputs associated with the primary economic calculation screener. If needed the department may request inputs for secondary economic indicators. Supporting documentation may be necessary as justification for some inputs. If the community does not have a municipal drinking water supply, inputs only need to be provided for (b.), (j.), and (k.) under the primary economic indicators.

Primary Economic Indicators

a. WWTF Sewer Miles	
b. Number of households served by WWTF	
c. Number of households hooked up to drinking water supply	
d. Number of households NOT hooked up to drinking water supply	
e. Drinking water supply maximum production in gallons per day	
f. Debt service for local Drinking Water Treatment Plant	
g. Current O&M costs for local Wastewater Treatment Plant	
h. Debt service for local Wastewater Treatment Plant	
i. Percent (%) of wastewater treatment user fees from residences	
j. Median Household Income	
k. Current Annual Sewer User Costs per Household	
l. Anticipated grant funding	
Cost per Mile of Pipe (assumed)	$1000000
Cost per Household for Hookup (assumed)	$15000
Softener Removal Charge for Households (assumed)	$2000

Secondary Economic Indicators

Bond rating	
Overall Net Debt as Percent of Full Above Market Value of Taxable Property	
Unemployment Rate	
Property Tax Revenues as a percent of full market value of taxable property	
Property Tax Collection Rate	

Note: A score is assigned to each secondary indicator based on state or national numbers. An overall score is then calculated to determine eligibility.

Appendix E.1 – Water Softener Survey Template Example

Survey of Residential Water Softener Usage

1. Do you have a water softener system installed in your home?

___ Yes
___ No
___ I'm not sure

2. Is the system currently in use?

___ Yes
___ No
___ I'm not sure

3. Is the home permanent or seasonal?

___ Permanent, owner-occupied
___ Permanent, renter-occupied
___ Seasonal, owner-occupied
___ Seasonal, renter-occupied

4. If seasonal (owner- or renter-occupied), how many months per year is it used?

___ Less than 3 months
___ 3–6 months
___ 6–9 months
___ 9–12 months

5. What type of system do you have?

___ Salt (sodium chloride) based
___ Non-salt-based
___ Not sure

6. When was the water softener system installed?

___ Within the last year
___ 1–5 years ago
___ 5–10
___ More than 10 years ago
___ I'm not sure

7. How many pounds of softener salt do you use each month?

____ pounds of salt per month
____ Not sure

8. What is your water softener capacity in grains per day (GPD)?

___ Less than 20,000 GPD
___ 20,000–40,000 GPD
___ 40,000–60,000 GPD
___ More than 60,000 GPD
___ I'm not sure

9. How do you have your water softener system serviced?

___ Professionally
___ Personally
___ We do not have it serviced

10. When was the last time it was serviced?

___ Within the last year
___ 1–2 years ago
___ 3–4 years ago
___ More than 4 years ago

11. When it was serviced, did the servicing involve optimizing or adjusting the hardness and/or flow settings?

___ Yes
___ No
___ I'm not sure

12. What type of automated regeneration process does your softener use?

___ Timer set to a specific interval or specific day/time
___ Demand-initiated regeneration (DIR) or hardness sensor
___ I'm not sure
___ No automated regeneration processes

13. If you indicated it uses a timer, what is the frequency?

___ Daily
___ Every 2–4 days
___ Every 5–7 days (e.g., once per week)
___ Every 8–10 days
___ Every 10–14 days (e.g., once every other week)
___ Less than once per two weeks
___ I'm not sure

14. Do you ever force regeneration?

___ Yes
___ No
___ I'm not sure

15. If you have forced regeneration, why?

_____

_____

_____

16. What other additional water treatment devices do you use? Please check all that apply.

___ GAC/carbon filtration, reverse osmosis, ultraviolet, other
___ Faucet-mounted filter
___ Activated charcoal filter pitcher (Brita)
___ Other (please describe)
___ I'm not sure
___ None

17. If you use additional water treatment, do you do so before or after the water softener?

___ Before
___ After
___ Both before and after
___ I'm not sure

(Complete Ranking Charts with an 'X' for each category as applicable)

18. How important are the following benefits of your water softening system?

Benefit	Not at all important	Slightly important	Moderately important	Very important
Better-tasting water				
Better-smelling water				
Less stains/water marks on dishes/silverware				
No stains on laundry				
Softer clothes				
Clothes last longer				
Less contaminants in the water				
Softer skin/cleaner hair				
Longer appliance life				

19. To what extent do you agree with the following statements about your water softener system?

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My water softener system is an important part of my home					
I could not do without my water softener system					
Salt-based water softeners are the best option for my house					

20. To what extent do you agree with the following statements about freshwater ecosystems?

Statement	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Preserving freshwater ecosystems is important					
Our freshwater ecosystems are being threatened by pollutants					
There are things that homeowners can do to protect freshwater ecosystems					
I enjoy recreational fishing					
I enjoy outdoor water-based activities					

Thank you for participating in this survey!

Please Return Completed Survey to:

[DELIVERY ADDRESS / DROP OFF LOCATION]

Appendix E.2 – Water Softener Survey Example Cover Letter

Example Cover Letter for Survey

Dear {name}

We have enclosed a brief survey that asks questions about water softener use in your home. Completing and returning this survey will help us better understand water softener system use among our customers. You are our best source of information on water softener use.

To encourage you to complete this survey, we have included {describe incentive}. We expect it should take no more than 10 minutes to complete the survey.

Thank you in advance,

{Signature}

{Name of signer}

Appendix E.3 – Water Softener Education and Outreach

Table 1. Methods for Outreach on Chloride Source Reduction Measures Targeting Water Softener Use	
Mail & Related	• Doorknob hangers* • Direct mailers (letters, flyers, or postcards) to customers* • Water bill inserts • Information in Consumer Confidence Reports issued by drinking water utility
In-Person	• Presentations and Q&A at regularly scheduled municipal meetings • Presentations and Q&A at special community meetings • Door-to-door outreach* • Formal or informal in-person focus groups (participation can be incentivized with gift cards or coupons)* • Meetings with homeowners' associations*
Media	• Posting general information, Frequently Asked Questions, resource documents, and contact information on municipal websites • Radio, cable television, and newspaper advertising • Movie theater advertising • Press events • Posting on social media (e.g., Facebook, Twitter, Instagram), with short messages, photos, or infographics on impacts of and solutions to chloride loading issues, environmental impacts, etc. and links to more information • Informational booths at local events (can be used to recruit/sign up participants in rebate or other voluntary programs, if relevant)
Public Postings	• Postings in municipal/public facilities (e.g., town hall, library, recreation facilities, community center) • Street signs*

Partnerships	• Partnering with other organizations to disseminate information directly or indirectly through their established channels and/or in their facilities, e.g.:
	  ○ Local watershed and other environmental groups
	  ○ National environmental organizations with local chapters
	  ○ Recreational operators
	  ○ Water softener companies
	  ○ Local businesses that sell water-using appliances and water/plumbing fixtures (e.g., home improvement/hardware stores)
	  ○ Other local businesses that targeted customers regularly frequent

* Can be targeted to neighborhoods with higher-than-average water softener (and/or older water softener technology) use, as needed.

Appendix F – Phosphorus PMP Plan Checklist

This Appendix is intended to be used as a resource by permittees and their consultants when selecting actions to include in a PMP plan in support of an individual phosphorus variance. The lists below represent a summary of PMP plan initiatives and actions undertaken by permittees to date. Not all actions will be relevant for a given facility. Likewise, facilities are not limited to the actions contained in this list. Minimum content for PMP plans is set to comply with 40 CFR 131.14 highest attainable condition requirements. Compliance with this requirement is evaluated on a case-by-case basis to ensure PMP plan actions are quantifiable, well documented, and working in a coherent manner towards meeting the final WQBEL.

Note: this appendix may be updated at a future date based on new approaches or lessons learned.

Checklist Format

To help structure PMP plans and define which actions are most applicable for a given facility, this checklist uses categories that work together in a hierarchy. Following this format when selecting actions will help ensure that PMP plans contain relevant actions and result in compliance as soon and efficiently as possible.

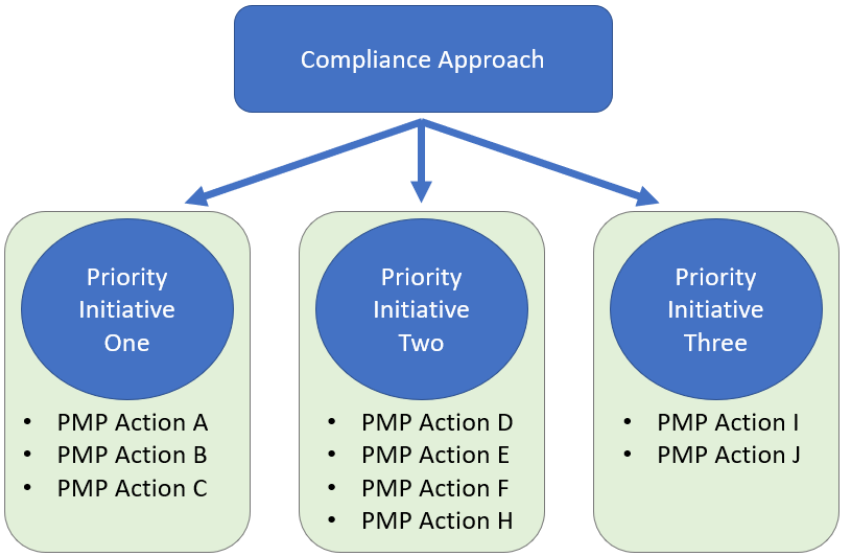


Figure 1. Visual representation of the relationship between PMP plan components

Compliance approach: This element establishes the overarching means for achieving the WQBEL. Typically, a permittee will select a single compliance approach when creating a PMP plan.

Priority initiative: Focused categories of actions that may work individually, or in tandem with other priority initiatives to remove barriers to compliance. A PMP plan will contain multiple priority initiatives to be employed concurrently.

PMP action: Discrete and specific actions that are undertaken in a given year of the variance term. Actions are the focus of the PMP plan during implementation.

Mandatory Actions

Pursuant to 40 CFR 131.14, water quality standards variances must fulfill highest attainable condition requirements (see Section 1.02 of this guidance). Activities deemed mandatory for inclusion in PMP plans will be based on the long-term compliance approach and initiatives selected, with the following tests applied:

1) Does the variance result in compliance with the standard as soon as possible? (i.e., is the PMP plan proposing the appropriate activities to work toward the selected compliance approach?)
(see 40 C.F.R. § 122.47(1) and s. NR 205.14, Wis. Adm. Code)

2) Is the greatest-feasible amount of pollutant reduction achieved during this variance term?
(see 40 C.F.R. § 131.14(b)(1)(ii)(A)(3) and s. 283.15(12), Wis. Stat.)

With regard to item two above, a basic set of actions related to source/influent control and in-plant/effluent control will be required for all facilities. These minimum actions represent cursory steps attainable by all facilities that adopt a PMP. Many facilities will have already taken similar actions during the initial compliance schedule issued with the phosphorus WQBEL. Subsequent actions adopted under the PMP plan should not be duplicative of previously completed steps. If completion of any of these steps has been documented, the PMP plan need not include them.

Source Reduction / Influent

1) Identify any new or existing commercial or industrial sewer users. For those entities already contacted, verify that no changes have occurred since the previous permit term.
2) Contact identified facilities regarding cleaning supplies, water treatment, food waste management, or animal waste management as applicable. A mailed questionnaire may be employed.
3) Identify and implement facility-specific phosphorus management plan for any substantial sources identified.
4) Evaluate sewer user ordinance/rate adjustment for commercial/industrial users.

In-plant / Optimization

1) Investigate eliminating or reducing acceptance of septage, if applicable and permissible under s. 281.49, Stats. Consider septage rate increases and/or pretreatment consistent with state statutes and regulations and funding contract terms.
2) For lagoons and stabilization ponds, measure sludge depth and plan for sludge management activities if necessary.
3) For mechanical plants, evaluate the feasibility of traditional (biological or chemical) phosphorus removal.

Watershed (applies if the compliance approach includes water quality trading)

1) Calculate how many pounds of phosphorus offset through trading are needed, and provide a cost estimate or define the scale of project that would achieve this offset.
2) Contact potential partner organizations at a minimum annual frequency. Facilities must contact the

local County Land and Water Conservation Department or another broker or clearinghouse, where available.
3) Identify steps that will be taken once a viable WQT project is identified.

Long-term Compliance Approach

The PMP plan should include all options needed to achieve the greatest phosphorus reduction feasible within the variance term while working towards final compliance. Select the long-term compliance option that is likely to be taken by this facility. A permittee may revise their PMP at time of permit reissuance. **Please select at least one option from the list below.**

Select One	Compliance Approach	Related Priority Initiatives
☐	Regionalization	• Regionalization (primary) • Inflow & Infiltration • Residential Source Reduction • Commercial / Industrial Source Reduction
☐	Water quality trading to achieve final WQBEL	• Water Quality Trading (Scoping) • Water Quality Trading (Project Establishment) • In-plant Optimization • Financial and capacity building • Source Reduction as needed
☐	Treatment technology-based solution to achieve final WQBEL	• Treatment Technology (Primary) • Inflow & Infiltration • Financial and capacity building
☐	Optimization and/or phosphorus reduction measures that will achieve final WQBEL	• In-plant Optimization (Primary) • Inflow & Infiltration • Residential Source Reduction • Commercial / Industrial Source Reduction
☐	Investigation and implementation of spray irrigation, land application, or other groundwater discharge	• Treatment Technology (Primary) • Inflow & Infiltration • Commercial/Industrial

Priority Actions and Initiatives

Priority initiatives are broad categories of effort that lead towards long term compliance. A single long-term compliance approach may contain multiple priority initiatives. Priority initiatives are supported by smaller, incremental steps called actions. Actions are focused steps that serve as the building blocks for the PMP plan. A PMP plan should identify the actions that will take place in each year of the variance. After selecting priority initiatives in the summary list, review each initiative's table in the subsequent pages to select actions supporting each initiative. Not all actions listed may apply to a given facility.

Priority Initiatives Summary List

Priority Initiatives	Selected This Variance Term (Check All that Apply)	Selecting in Future Variance Term (Check All that Apply
Residential Influent / Source Reduction encompasses activities that reduce phosphorus loading from residential sources including single family homes, multi-family complexes, or other sources of domestic waste.	☐	☐
Commercial or Industrial Influent / Source Reduction focuses on business entities and their associated operations that may result in phosphorus loading to the WWTF. Sources include cleaning products or materials used in a production process.	☐	☐
In-plant Optimization includes actions to optimize existing facility treatment processes that will improve phosphorus removal capability.	☐	☐
Inflow/Infiltration includes actions to address additional flows into sewer system that were not originally intended to be processed by the facility.	☐	☐
Treatment Technology includes actions to investigate, pilot, and install technological solutions intended to meet the final phosphorus WQBEL.	☐	☐
Regionalization as a priority initiative is applicable when regionalization is possible but not a certain solution. The initiative contains actions that work towards scoping and formalizing regionalization as a compliance solution.	☐	☐
Water Quality Trading: Scoping includes early-stage actions for planning a water quality trading compliance solution. Actions focus on understanding facility needs and identifying trading partners.	☐	☐
Water Quality Trading: Project Establishment is applicable when viable water quality trading projects have been identified. The initiative includes actions for execution of WQT including quantification of pollution reductions, project design, and project establishment for a specific site.	☐	☐
Financial and Capacity Building is an initiative that is designed to remove barriers to compliance stemming from a lack of funding or staffing. These may include planning, budgeting, and fundraising actions.	☐	☐

Priority Initiative: Residential Influent / Source Reduction

The residential influent / source reduction initiative focuses on reducing the amount of phosphorus that enters the collection system at residential connections in the sewer service area. This priority initiative will be applicable for most municipal POTWs, as domestic waste from households is often the primary source of influent for these facilities. Many of the actions associated with residential source reduction involve education and outreach to inform residents of best practices for reducing their individual

phosphorus contribution to the system. Accordingly, many of the actions are low-cost and can be carried out by municipal staff.

Residential Influent / Source Reduction Actions	Year 1	Year 2	Year 3	Year 4	Year 5
Source Control Mailings: Distribute information to residents encouraging specific phosphorus reduction measures related to typical domestic activities	☐	☐	☐	☐	☐
Phosphorus Source Informative Mailings: Distribute information to residents regarding atypical sources of phosphorus (cleaning products, hobby or niche activities, POE phosphate use) to avoid	☐	☐	☐	☐	☐
Annual Phosphorus Source Control Newspaper Article: Discuss phosphorus compliance challenges at the WWTF and how sewer users can help	☐	☐	☐	☐	☐
Annual Phosphorus Source Control Website/Social Media Post: Discuss phosphorus compliance challenges at the WWTF and how sewer users can help	☐	☐	☐	☐	☐
Conduct periodic meetings with the Municipal Board and interested residents to help encourage input on phosphorus source reduction measures	☐	☐	☐	☐	☐
Mailing campaign to educate residential customers regarding composting food scraps instead of disposing via sewer connection	☐	☐	☐	☐	☐
Evaluate phosphate use in drinking water supply: identify which products are used and resulting phosphorus concentration in finished drinking water	☐	☐	☐	☐	☐
Evaluate feasible steps for reducing or eliminating phosphate in the water supply	☐	☐	☐	☐	☐
Adjust the concentration of phosphate used in drinking water with assurance that drinking water is not compromised	☐	☐	☐	☐	☐
Implement municipal-wide compost program	☐	☐	☐	☐	☐
Institute a pet waste policy on lands where pet waste may be entering waterways	☐	☐	☐	☐	☐
Adopt a new leaf collection program in areas where leaves or other yard waste has historically entered storm sewers or surface waters	☐	☐	☐	☐	☐
Implement municipal-wide rebate/buy-back program of phosphorus-containing products	☐	☐	☐	☐	☐
Update applicable sewer user ordinances based on the outcome of previously taken actions	☐	☐	☐	☐	☐

Priority Initiative: Commercial or Industrial Influent / Source Reduction

Commercial or industrial contributors to the collection system may disproportionally impact influent phosphorus concentrations, requiring greater pollutant removal at the facility. Efforts to reduce influent phosphorus contributions from specific entities can provide a cost-effective pollution reduction, making other compliance options more feasible or even facilitating compliance in extreme circumstances. Based on the type of business or industry, there may be multiple avenues for evaluating and reducing individual phosphorus contributions. General education and outreach to all commercial or industrial contributors is a good first step, however, individualized attention may be necessary to achieve results. Chapter 4 of this guidance document contains industry-specific suggestions for identifying and reducing phosphorus contributions to the WWTF.

Commercial or Industrial Influent / Source Reduction Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Evaluate local businesses for potential to contribute high levels of phosphorus to the collection system based on business type and other readily available information	☐	☐	☐	☐	☐
Contact any new commercial or industrial entities that contribute to the collection system to identify potential phosphorus sources	☐	☐	☐	☐	☐
Conduct monitoring within the collection system to help identify new sources of high-strength waste	☐	☐	☐	☐	☐
Review a specific business/industry's water use and characterize the load of pollutant discharged	☐	☐	☐	☐	☐
Visit or meet with a specific commercial or industrial facility to evaluate phosphorus contributions and discuss ways to reduce those contributions	☐	☐	☐	☐	☐
Conduct an in-depth analysis of a specific facility's process to identify measures which will reduce phosphorus contributions	☐	☐	☐	☐	☐
Implement process changes, optimization, or pretreatment for a specific commercial or industrial facility	☐	☐	☐	☐	☐
If phosphate is used to treat municipal water, evaluate the feasibility of alternate source water for an industry or commercial facility	☐	☐	☐	☐	☐
Implement sewer user ordinance to increase rates for commercial or industrial entities that are significant phosphorus contributors	☐	☐	☐	☐	☐
Impose pre-treatment requirements for commercial or industrial facilities	☐	☐	☐	☐	☐

Develop a one-time rebate program for facilities that successfully complete and document a phosphorus identification and management plan	☐	☐	☐	☐	☐

Priority Initiative: In-plant Optimization

When seeking to maximize the pollutant removal performance of existing equipment, optimization actions may be considered in a PMP plan. These actions will typically be economical to implement and will have varying degrees of success. Limitations of equipment at hand will be a major factor determining how close optimization actions alone can come to achieving compliance. Most low-level phosphorus limits will require additional actions beyond optimization. Applicable optimization actions will vary by facility type – not all actions listed below will be an option for a given facility. Optimization actions may reduce the amount of phosphorus offset required for water quality trading and should be considered when selecting the water quality trading compliance approach. This checklist may be used as a resource when developing an optimization plan for a type 2 phosphorus variance.

In-Plant Optimization Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
For lagoons and stabilization ponds: measure sludge depth and plan for sludge management activities if necessary. Measure sludge production (gallons and % solids).	☐	☐	☐	☐	☐
Evaluate phosphorus speciation of influent and/or at relevant points in the treatment train	☐	☐	☐	☐	☐
Optimize sludge wasting rates	☐	☐	☐	☐	☐
Evaluate sludge decant and sludge dewatering processes	☐	☐	☐	☐	☐
Pilot different chemical addition rates and document resultant phosphorus effluent concentrations	☐	☐	☐	☐	☐
Optimize type of chemical added based on jar or pilot tests	☐	☐	☐	☐	☐
Optimize location of chemical addition during treatment, including an evaluation of the level of mixing achieved	☐	☐	☐	☐	☐
Implement changes in chemical phosphorus removal based on pilot test results	☐	☐	☐	☐	☐
Determine sludge accumulation from chemical precipitation and how this may impact sludge management activities	☐	☐	☐	☐	☐

Optimize existing recirculating sand filter infrastructure including settling in septic tank (sludge management) and control of weed growth within the filter	☐	☐	☐	☐	☐
Evaluate sand filter media performance, rehabilitate as needed	☐	☐	☐	☐	☐
Conduct an optimization study for biological phosphorus removal based on modification of existing equipment	☐	☐	☐	☐	☐
Implement changes to existing equipment to achieve greater biological phosphorus removal	☐	☐	☐	☐	☐
Install new equipment to achieve biological phosphorus removal	☐	☐	☐	☐	☐
Optimize existing primary or secondary clarifier	☐	☐	☐	☐	☐
Eliminate septage intake or require pre-treatment	☐	☐	☐	☐	☐
Conduct in-plant monitoring to evaluate the impacts of optimization actions	☐	☐	☐	☐	☐

Priority Initiative: Inflow and Infiltration

Inflow and infiltration is recognized as a major challenge for many municipal treatments works throughout the State of Wisconsin. Deteriorating collection system infrastructure may result in large quantities of ground water, flood water, or runoff entering the system. While this "clear" water may have lower concentrations of phosphorus and other pollutants, the increase in influent volume may compromise treatment processes or contribute to exceedance of mass-based limits. Efforts to address collection system deficiencies should be well documented and go beyond efforts typically planned as routine maintenance. If targeting sources of phosphorus in I/I, the area should be documented as having I/I issues present without the ability to make the necessary corrections. Prior to pursuing this priority initiative, a facility should document the existence of collection system issues that result in I/I and result in a barrier to phosphorus compliance or interim phosphorus reductions.

Infiltration/Inflow Activities	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Televise portions of the collection system to identify the specific locations and types of deficiencies of the system	☐	☐	☐	☐	☐

Conduct a manhole inspection and evaluation study to prioritize I/I activities	☐	☐	☐	☐	☐
Engage in a CMOM audit and evaluation to identify specific improvements to currently planned actions under the CMOM program	☐	☐	☐	☐	☐
Assess the collection system for basement / foundation or stormwater drain connections.	☐	☐	☐	☐	☐
In areas where I/I issues are identified, work to reduce sources of phosphorus such as leaf accumulation, grass clippings, soil particulate, and pet waste.	☐	☐	☐	☐	☐
Create a short-term plan to initiate collection system repair projects	☐	☐	☐	☐	☐
Undertake collection system repairs at locations identified	☐	☐	☐	☐	☐
Use flow and precipitation data to evaluate I/I flow reduction	☐	☐	☐	☐	☐
Using monitoring data to evaluate the results of I/I flow reduction on treatment processes	☐	☐	☐	☐	☐

Priority Initiative: Treatment Technology

Compliance with phosphorus WQBELs often requires some form of pollutant removal at the facility. Less restrictive WQBELs can generally be met with biological and/or chemical phosphorus removal (BPR/CPR). Low-level WQBELs often require a filtration-type process. A PMP plan may include actions that focus on final compliance via a facility upgrade. These may start with an investigative phase, proceed through a budgeting/fundraising phase, and eventually result in initiation of construction. Pilot testing actions may also be included in this initiative. A compliance schedule to implement an upgrade within the permit term may be required if feasible installation of treatment technology is reasonably capable of meeting the final limit within the permit term.

Treatment Technology Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Confirm via pilot testing the viability of traditional phosphorus removal treatment technology (BPR, CPR, etc.) for meeting final phosphorus limits	☐	☐	☐	☐	☐
Implement phosphorus removal treatment technology (BPR, CPR, etc.)	☐	☐	☐	☐	☐

Identify and collaborate with a third-party (e.g., academic researcher, technology firm) to create on-site phosphorus removal treatment technology	☐	☐	☐	☐	☐
Determine appropriate tertiary filtration technology to meet a low-level phosphorus WQBEL	☐	☐	☐	☐	☐
Compile a facility plan or plans and specifications for a tertiary filtration system	☐	☐	☐	☐	☐
Construction activities related to installation of tertiary filtration	☐	☐	☐	☐	☐

Priority Initiative: Regionalization

Regionalization is a term that describes the transition from smaller sewerage systems into larger, regional sewerage systems. In a regionalized scenario, waste from one or more communities or industries is conveyed to and treated at a single larger facility. Although conveyance can be costly, there are many advantages to regional treatment. An economy of scale can allow higher quality wastewater treatment while keeping user costs low. This option may be appealing to facilities nearing the end of their design life, facilities whose locations are no longer suited to wastewater treatment, or instances in which new development offers opportunities for new treatment facilities to be constructed. Combining of sewerage systems may also be referred to as joint treatment. Facilities seeking to implement a regionalization approach may be required to do so under a compliance schedule (rather than a variance) if possible.

Regionalization Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Identify regionalization partner(s)	☐	☐	☐	☐	☐
Create a budget, timeline, and facility plan	☐	☐	☐	☐	☐
Creation of a joint sewerage commission or similar entity	☐	☐	☐	☐	☐
Meet with municipal leadership from both communities to provide a project update and discuss issues	☐	☐	☐	☐	☐
Evaluate treatment capacity relative to both waste streams	☐	☐	☐	☐	☐

Start construction of collection system modification	☐	☐	☐	☐	☐

Priority Initiative: Water Quality Trading - Scoping

In many situations, water quality trading may be more economical than on-site treatment, particularly when low phosphorus WQBELs would necessitate a major facility upgrade. Facilities seeking compliance via water quality trading may include PMP plan actions that outline steps taken to implement these options. The Scoping priority initiative includes actions typically taken during early stages of a water quality trading effort. PMP plans that utilize a water quality trading compliance approach may focus on scoping for the first several years but should be prepared to transition to project establishment once an opportunity is identified.

Water Quality Trading - Scoping Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Determine eligible watershed area for implementing water quality trading projects to obtain credits.	☐	☐	☐	☐	☐
Brief municipal administration, board, or other decision makers regarding compliance alternatives such water quality trading	☐	☐	☐	☐	☐
Contact local county land conservation department, WQT broker, or WQT clearinghouse to request assistance and convey WQT credit needs	☐	☐	☐	☐	☐
Meet with local county land conservation department to discuss criteria for a nonpoint source offset and/or obtain information about potential projects	☐	☐	☐	☐	☐
Continue evaluation of potential partners within the watershed.	☐	☐	☐	☐	☐
Evaluate the stormwater system for potential credit-generating stormwater projects (must reduce pollutant loading below baseline level of required compliance)	☐	☐	☐	☐	☐
Investigate phosphorus reduction measures on farm fields that receive municipal sludge	☐	☐	☐	☐	☐
Complete survey of agricultural fields to identify highest-loading areas and possible WQT opportunities	☐	☐	☐	☐	☐
Complete survey of riparian areas to determine need for streambank stabilization	☐	☐	☐	☐	☐

Hold an annual meeting with stakeholder organizations (agricultural groups, environmental organizations, associations, etc.)	☐	☐	☐	☐	☐
Investigate funding opportunities for WQT projects. Pursue any viable funding opportunity.	☐	☐	☐	☐	☐
Evaluate municipal land for potential nonpoint source projects.	☐	☐	☐	☐	☐

Priority Initiative: Water Quality Trading – Project Establishment

Once trading partners have been identified, steps must be taken to quantify, document, and formalize the water quality trade. Steps may be carried out by a consultant, partner organization, or other entity involved with the water quality trading effort.

Water Quality Trading – Project Establishment Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Meet with the local county land conservation department/WQT broker or WQT clearinghouse to discuss a specific project	☐	☐	☐	☐	☐
Gather field data (measurements, soil tests, etc.) for quantifying pollutant loading of a potential WQT project	☐	☐	☐	☐	☐
Complete modeling analysis for selected WQT projects	☐	☐	☐	☐	☐
Evaluate selected projects for cost effectiveness	☐	☐	☐	☐	☐
Prepare and execute any legal documents or water quality trading agreements	☐	☐	☐	☐	☐
Prepare plans and specifications for WQT projects	☐	☐	☐	☐	☐
Prepare water quality trading plan; provide plan to DNR for review and approval	☐	☐	☐	☐	☐
Chapter 30 permitting for streambank projects, obtain other required construction permits	☐	☐	☐	☐	☐
Bid or solicit contractors for project installation activities	☐	☐	☐	☐	☐
Construction activities for a specific water quality trading project	☐	☐	☐	☐	☐

Submit Management Practice Registration Form (3400-207) for completed projects	☐	☐	☐	☐	☐

Priority Initiative: Financial and Capacity Building

As discussed in Chapter 2 of this guidance, the majority of variances in Wisconsin use a factor six justification which requires a demonstration that compliance costs will result in substantial and widespread adverse social and economic impacts within the applicant's community. Since economic constraints will be a main reason for a facility to pursue a variance, there will often be a need to increase the amount of funding or staffing to achieve various variance-related objectives. Actions contained in this priority initiative include strategies for obtaining additional funding or staff resources.

Financial and Capacity Building Actions	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Evaluate sewer user rates and other revenues to determine financial sustainability and the need for additional revenue	☐	☐	☐	☐	☐
Evaluate current staffing levels and create recommendations for future staffing levels based on the compliance approach selected	☐	☐	☐	☐	☐
Investigate low or zero interest rate loan opportunities made available by the Wisconsin Clean Water Fund Program	☐	☐	☐	☐	☐
Investigate grant opportunities for future projects that will lead to compliance with the phosphorus WQBEL	☐	☐	☐	☐	☐
Apply for selected grants or low-interest loans to fund upgrades to the facility or watershed projects	☐	☐	☐	☐	☐
Update applicable sewer use ordinances or Implement rate changes	☐	☐	☐	☐	☐
Within the budget, create an account or recurring line item for future non-point source practices or treatment plant projects	☐	☐	☐	☐	☐
Continued annual review of sewer user charges to ensure adequate funds are available for PMP Plan actions	☐	☐	☐	☐	☐

PMP Completion and Submittal

After reviewing the actions listed above, use the PMP template (Appendix B) to organize selected actions into a cohesive, standalone document to submit as a PMP.