

NATURAL RESOURCES BOARD AGENDA ITEM

SUBJECT: Request adoption of Board Order WT-36-07, revisions to NR 102 and NR 106 relating to water quality standards for heat and associated procedures for the calculation of point source effluent limitations.

FOR: MAY 2009 **BOARD MEETING**

TO BE PRESENTED BY: Russ Rasmussen, Director - Bureau of Watershed Management

SUMMARY:

In 1975, several steam-electric power companies sued the department on the grounds that the temperature standards set forth in ch. NR 102, Wis. Adm. Code, were more stringent than federal requirements. The case was heard before the Wisconsin Supreme Court which ruled that the provisions of ch. NR 102 were equivalent to categorical-based effluent limitations for the steam-electric power discharge category and overturned the thermal requirements of ch. NR 102. The effect of the ruling was to severely limit the department's ability to regulate the amount of heat discharged from power plants which extended to other sources of heat as well. The end result is that the department has been unable to effectively and consistently regulate the discharge of heated water in WPDES permits. Instead, the department has had to rely on voluntary heat management which has been the exception versus the norm.

In 1990, USEPA objected to two WPDES permits for power plants on the grounds that heat was not regulated consistent with the federal Clean Water Act. In response, the department committed to attempt to revise of the standards to be responsive to both the Wisconsin Supreme Court decision and the federal Clean Water Act. An external advisory committee met from 1994-1997 and a draft rule was taken to public hearing in 1998 meeting significant opposition. A reformed committee began anew in 2001 and met 16 times to address outstanding comments and concerns..

A revised rule package was taken to public hearings in January 2008 and it generated a significant number of comments in opposition of the draft rules from both those that felt the rules were too stringent and those that felt it was not stringent enough. An additional public meeting was held in January 2009 at which the department shared information on the revisions made to the draft rules in response to many of the comments received, including those of USEPA which has since indicated the proposal is consistent with Clean Water Act requirements. The attached rule package reflects all changes made in response to the comments received from 2008 as well as feedback received in recent months.

RECOMMENDATION: Adopt Board Order WT-36-07, revisions to NR 102 and NR 106 relating to water quality standards for heat and procedures for the calculation of point source effluent limitations.

LIST OF ATTACHED MATERIALS:

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|----|-------------------------------------|---|-----|-------------------------------------|----------|
| No | <input type="checkbox"/> | Fiscal Estimate Required | Yes | <input checked="" type="checkbox"/> | Attached |
| No | <input checked="" type="checkbox"/> | Environmental Assessment or Impact Statement Required | Yes | <input type="checkbox"/> | Attached |
| No | <input type="checkbox"/> | Background Memo | Yes | <input checked="" type="checkbox"/> | Attached |

APPROVED:

_____/s/
Bureau Director,

Date 4/17/09

_____/s/
Administrator,

Date 4/21/09

_____/s/
Secretary, Matt Frank

Date 5/14/09

DATE: April 6, 2009

TO: Natural Resources Board Members

FROM: Matthew J. Frank, Secretary

SUBJECT: Background Memo on Recommended Revisions to Chapters NR 102 and 106
Pertaining to Thermal Water Quality Standards and Associated Water Quality-Based
Effluent Limitation Calculation Procedures for Heated Discharges to Surface Waters
of the State

1. Why Revisions to these Rules are Being Proposed

The discharge of wastewater containing pollutants is regulated by the federal Clean Water Act and Wisconsin Statutes with the purpose of preventing adverse impacts to humans, fish, and other aquatic life. For some permitted discharges, the temperature of the effluent discharged to lakes, rivers, and streams may threaten the normal function of aquatic life communities. In particular, thermal pollution may have the following effects:

- a) Redistribution and relocation of organisms by avoidance (primarily fish),
- b) Reduction of dissolved oxygen levels (due to lower gas saturation and increased bacterial decomposition of organic matter),
- c) Increased metabolism in fish and non-fish organisms which makes them more susceptible to effects of low dissolved oxygen, toxic substances, parasites, and disease,
- d) Increased algal and plant growth creating nuisance conditions and reduction in stream flow,
- e) Suppression of gamete production,
- f) Elevated rates of embryonic failure,
- g) Lethality to fish in extreme cases, and
- h) Lethality to non-mobile organisms (e.g., shellfish, aquatic insects, & some plants).

In 1974, Wisconsin developed water quality standards for heat which were approved by USEPA as required in Public Law 92-500, the "Federal Water Pollution Control Act Amendments of 1972." Those standards became effective in 1975 following the normal rule-making process. Subsequently, the Department was sued by several steam-electric power companies on the grounds that the application of the temperature standards set forth in ch. NR 102, Wis. Adm. Code, in Wisconsin Pollution Discharge Elimination System (WPDES) permits were more stringent than federal requirements and, thus, contrary to Section 283.11(2), Stats. Although other provisions in federal and state law assured that aquatic life was protected, the effect of the Wisconsin Supreme Court ruling was to severely limit the Department's ability to regulate the amount of heat discharged from power plants. Additionally, the decision has made regulation of all heated discharges to waters of the State confusing and difficult to implement consistently.

These rules have been under development for nearly 15 years. For a variety of reasons, including concerns by the regulated community about the affect of thermal standards on business operations and by the environmental community about whether the standards were protective of aquatic life, resulted in further delay after hearings on a rule package in 1998. The Department received permission to conduct public hearings on a contemporary rule package and did so in January 2008. An additional public information meeting was held in Madison on January 14, 2009 to inform interested parties of the changes made since the January 2008 public hearings. Most recently, the Department received a letter from USEPA (Attachment 5) asserting a strong desire for adoption of water quality criteria for temperature in Wisconsin noting that all of the other Region 5 states have had temperature criteria in their water quality standards for at least twenty years. USEPA went on to state that Wisconsin is the only Region 5 state that has not implemented temperature criteria uniformly across the state. Completing this rule package would allow WDNR to implement standards in a manner consistent with the federal Clean Water Act and avoid any further related objections by U.S. EPA to WPDES permits issued to dischargers of heated effluent.

The rules presented for adoption at this time meet U.S. EPA requirements, are responsive to many concerns of the regulated community and, most importantly, provide for the protection and propagation of aquatic life in Wisconsin's surface waters. They will allow for the orderly and consistent application of temperature effluent limitations in WPDES permits.

2. Summary of the Rule

Chapter NR 102 - Water Quality Standards for Wisconsin Surface Waters. The existing thermal standards are found in ss. NR 102.04, 102.05, and 102.07 - 102.09. The current proposal will amend several subsections of ss. NR 102.04 and 102.05, repeal ss. 102.07 - 102.09, and create a new Subchapter II entitled "Water Quality Standards for Temperature." Subchapter II identifies water quality criteria and default ambient temperatures for specific fish and aquatic life use communities, as well as other site-specific temperature-related standards.

Chapter NR 106 - Procedures for Calculating Water Quality Based Effluent Limitations for Toxic and Organoleptic Substances Discharged to Surface Waters. The title of this rule is proposed to be amended to "Procedures for Calculating Water Quality Based Effluent Limitations for Point Source Discharges to Surface Waters." There is no provision in the existing NR 106 stating procedures for calculating temperature limits in WPDES permits. The current proposal will create two new subchapters: Subchapter V entitled "Effluent Limitations for Temperature", and Subchapter VI entitled "Alternative Effluent Limitations for Temperature." Subchapter V specifies methods for calculating water quality-based effluent limitations for temperature and determining the necessity for such limitations in a permit and mechanisms for application of and compliance with the limitations. The proposed rule takes into account the ambient temperature and flow of a receiving water in the calculation of effluent limitations. The effluent limitation calculation incorporates a mass balance equation, making it

equivalent to other codified limit calculation procedures. The mass balance approach enables the determination of the amount of heat that a receiving water can assimilate without adversely affecting fish and other aquatic life. Supplemental limits, including those of 120°F to prevent incidental injury (scalding) to humans, 86°F to protect other limited aquatic life waterbodies, and those to be considered on a site-specific or case-by-case basis, are also proposed. Subchapter VI specifies procedures for determining alternative effluent limitations that may be established for point source discharges with limitations calculated under Subchapter V that are demonstrated to be more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is made. The Subchapter includes application, compliance schedule, and public notice procedures, among others. Subchapter VI replaces Chapter NR 209, which is repealed.

3. How does this proposal affect existing policy?

Since the Wisconsin Supreme Court ruling, the Department's ability to issue WPDES permits containing temperature limitations has been limited. Despite this difficulty, some limitations based on the existing standards have been placed in permits, including more than 500 General Permits for dischargers of non-contact cooling water or condensate and boiler water. All limitations have been based on a maximum allowable rise at the edge of a mixing zone of 5°F for rivers and streams and 3°F for lakes. In addition, power plant owners demonstrated in the late 1970s and early 1980s that the heated discharges from individual power plants (the largest discharges of heat in the state) were not adversely affecting aquatic life. These demonstrations, now almost 30 years old, need to be updated with new information commensurate with current knowledge and these new temperature standards.

The adoption of these rules will establish a more realistic set of standards and procedures for protecting fish and aquatic life from discharges of heat into waters of the state. A primary reason for this is that existing policy does not effectively consider the ability of the receiving water to assimilate heat, nor does it adequately account for the different biological needs of fish and aquatic life over the course of the varying seasons in a year or across different water body classifications. The rules not only allow each receiving water to be evaluated for its own heat dissipating characteristics, but also account for the biological needs of aquatic life during different times of the year, which is addressed primarily through the application of both acute and sub-lethal monthly temperature water quality criteria. The inclusion of the sub-lethal criteria and the application of criteria on a monthly basis is a significant difference between the existing and proposed rules, but one that clearly makes the proposed rules much more water quality-based.

The inclusion of the sub-lethal criteria and the application of criteria on a monthly basis does present the possibility that department staff may have a small increase in workload during permit drafting due to an increased number of calculations. However, with the use of appropriate information technology and training this increase in workload should be relatively minor.

4. Hearing Synopsis

January 2008 Public Hearings: Three hearings were held on the rule (Green Bay, Madison, Waukesha) in January 2008. Forty-three (43) persons attended the hearings and three (3) made oral comment at the hearing. Additionally, the Department received thirty-six (36) written comments on the proposed rule. A compilation of comments received and responses thereto are attached to this memo.

Following the public hearings and receipt of all comments, the Department entered into discussions with U.S. EPA concerning provisions of the proposed rules that were incorporated to satisfy U.S. EPA's concerns about consistency with the federal Clean Water Act. Of primary concern to the Department was the U.S. EPA position on the use of "cap limits" – effluent limitations that were to be imposed regardless of whether or not they were needed to protect aquatic life. The "cap limit" requirement generated a significant number of adverse comments by many sectors of the regulated community.

The Department proposed an alternative approach that would achieve the same level of protection as the "cap limits" would have where it was determined to be necessary. As a result of these joint discussions, U.S. EPA agreed to the changes described below in response to the Agency's formal comments.

The primary issues raised and how the proposed rules were modified are as follows:

- Cap Limitations – Many comments were received by regulated dischargers that the proposed maximum temperature limitations proposed for various discharge locations were not supported by science, and were overly stringent, especially for smaller dischargers to large waterbodies.

Department Response: The "cap limits" in the proposed rule were removed. In their place, a table describing the ratio of stream flow to effluent flow ($Q_s:Q_e$) has been included to specify the calculation methodologies for discharges to rivers and streams. An additional provision was added to assure aquatic life protection following U.S. EPA mixing zone guidance.

- Limitations not necessary – Regulated dischargers commented that there is no evidence of existing harm from heated discharges and, therefore, this rule is not necessary.

Department Response: Scientific literature is widely available that documents the adverse impacts of increased heat loads to aquatic ecosystems. While it is not common for the Department to respond to fish kills related to thermal discharges, there are a few documented cases of this phenomenon in recent years. It is more likely that the

introduction of thermal discharges has changed the natural community of fish and other aquatic life that once resided in the mixing zone of a given discharge. Organisms that are less tolerant of elevated temperatures have probably been replaced by those that are more thermally tolerant. It is also likely that reproduction success has been adversely affected such that recruitment of organisms (survival to reproductive age) may be suppressed. Limited resources to monitor stream resources in recent years has not allowed the Department to focus on the collecting data to document the site-specific affects of thermal discharges in Wisconsin waters.

Regardless, U.S. EPA has objected to the issuance of permits where a heat load necessitates an evaluation of reasonable potential to exceed necessary thermal limitations.

Because of the ruling of the Wisconsin Supreme Court in 1975, the Department cannot successfully include those effluent limitations when needed. If the proposed rule is not promulgated and approved by U.S. EPA in its oversight of Wisconsin's program, those objections may result in the U.S. EPA having to issue wastewater discharge permits consistent with federal regulations. This in itself is reason enough for the Department to revise the water quality standards.

- Limitations too burdensome – Dischargers commented that the costs to install cooling equipment and associated energy-related impacts were too great and exceeded any benefits of reducing heat in discharges.

Department Response: Many discharges provided no substantive cost data to support a general claim of excessive costs. Several dischargers – both industrial and municipal – suggested capital and operational costs required to install cooling. Many of those values were in response to the requirement for cap limitations and perceived inclusion of all municipal discharges. With the proposed changes made to the draft rules, the Department believes the need for cooling technology will be limited to those operations that have a reasonable potential to cause or contribute to an exceedence of the proposed water quality standards in the receiving water. Lastly, in all cases, the proposed rules provide several provisions that will allow a discharger to seek case-specific relief from limitations – either by providing more site-specific information to be used to calculate effluent limitations or by seeking alternative effluent limitations altogether.

- Discharges from Publicly Owned Treatment Works (POTWs) – The temperature of wastewater discharged from most domestic sewage treatment plants is typically between 50-55°F reflecting the temperature of the groundwater that serves as the water supply. Cooling of effluent to more closely approximate winter river temperatures would require high-cost operation of mechanical chilling equipment. As a result, POTWs have historically been exempt from meeting thermal standards. However, an exemption from meeting standards is not consistent with the Clean Water Act. The draft rule contained a variance for POTWs under certain conditions. Comments were received ranging from

those that wanted an outright exemption to others who suggested that there should be no exemption or variance language specific to POTWs.

Department Response: This portion of the rule has been substantially modified from what was proposed following discussions with U.S. EPA. Although the final rule will typically not result in the establishment of temperature effluent limitations for POTWs, an individual evaluation will be made at permit issuance by Department staff as to whether heat dissipation occurs in receiving waters such that aquatic life is protected.

- Site-specific and alternative limitations – Comments were received suggesting that the burdens associated with demonstrations required for site-specific and alternative effluent limitations were too great and that there was not certainty in the outcome of the process.

Department Response: This process proposed is authorized in both the §316(a) Clean Water Act as well as s. 283.17, Wisconsin Statutes. The permitting process, including the legal and public review procedures available, assure the decisions are in conformance with state and federal law.

- Mixing zones – Comments were received suggesting that the dilution provided for mixing zones was insufficient while others suggested that the dilution available should be even less based on site-specific concerns.

Department Response: The values established are similar to values used to calculate water quality-based effluent limitations for other pollutants as described in other sections of Chapter NR 106. Provisions are made to either expand or reduce mixing zone size based on site-specific conditions.

- General Permit – Many comments suggested that “cap limitations” are unnecessary and that monitoring requirements are excessive, given the low risk of potential harm.

Department Response: The “cap limitations” have been removed as applied to general permits and the determination of limitations is referenced to procedures which are similar to other individual permits. The proposed rule authorizes the Department to establish limitations at the time general permit coverage is granted for each facility. Monitoring requirements are not changed, but submittal of data is optional and Department staff may allow the facility to make the data available when requested.

- Rules not adequately protective of aquatic life – Comments received suggested that the proposed water quality criteria are not sufficiently stringent to protect aquatic life.

Department Response: The temperature criteria were derived using the best information and science available and are a significant advancement beyond criteria used in other

states and by U.S. EPA. The Department believes the methods to calculate and establish limitations in permits are and will be protective of aquatic life and will result in increased consistency and certainty in the permitting process.

January 2009 Public Information Meeting: A public information meeting was held in Madison on January 14, 2009 to inform interested parties of the proposed changes made to the draft rule package in response to comments that had been received during the January 2008 public comment period. Approximately 30 non-WDNR staff attended the meeting in which a summary of the changes made was presented with an opportunity for questions afterward. In addition, feedback from interested parties was solicited on the draft rule package reflecting the changes. Written feedback was received by 12 different groups representing municipal, industrial, and environmental advocacy interests.

Since that public meeting, the Department made additional changes to the rule as summarized in an Addendum to the Response to Comments (Attachment 3). Some of the issues raised and how the proposed rules were modified are as follows:

- Representatives of the municipal POTW sector were concerned about the proposed change in rule language affecting their facilities on two accounts: 1) they were not aware of the shift in regulatory strategy away from the “categorical variance” and felt they had not been given time to assess the impact of the change; and 2) they believed the language was too nebulous and would raise the risk of inconsistency on how the provisions were implemented by Department staff.

Department Response: Staff worked closely with representatives of the POTW community to clarify the mechanism by which “dissipative cooling” would be assumed. Revisions to the proposed rule language included clarification on how the rule would be applied to existing dischargers versus new or those re-locating an outfall structure to a previously unimpacted water body or segment.

- Questions were raised about how the calculation of limitations for inland lake discharges did not account for dilution and instead relied only on dissipation of heat to the atmosphere.

Department Response: No change in the mixing zone formula was proposed in response to comments received because of the site-specific nature of each case. Instead, clarifications were made to s. NR 106.58 about how the results of site-specific modeling of mixing would be used in lieu of the formula based limitations in s. NR 106.55.

- Representatives of the environmental advocacy community suggested that the proposed water quality criteria in Chapter NR 102 were not protective of aquatic life.

Department Response: No changes were made to the water quality criteria as recommended by the commenters. The Department believes the criteria proposed are adequately protective of fish and aquatic life based on the literature available at the time they were developed and in recognition of the non-conservative nature of heat versus other pollutants like persistent toxic substances. The rules do provide the Department with the authority to impose more stringent effluent limitations than necessary if there are compelling reasons to do so. This would include cases where there is reason to believe the water quality criteria may not be protective of a particular fish assemblage.

- Representatives of the environmental advocacy community suggested that the eligibility criteria for dischargers of non-contact cooling water for a General Permit were not restrictive enough.

Department Response: Some of the eligibility criteria that were eliminated were related to the “cap limits” that were removed following the January 2008 public hearings. Accordingly, they are not included in the current rule package. Two provisions related to additives and public hazards due to unsafe ice conditions were reinstated in the proposed rule.

- Representatives of the pulp & paper industry questioned the use of daily maximum effluent flow values being used to establish sub-lethal limitations that were ultimately expressed in a WPDES permit as a weekly average limitation.

Department Response: Revisions were made to modify the effluent flow used to establish sub-lethal effluent limitations.

Detailed responses to the feedback received in response to the January 14, 2009 meeting is provided as an Addendum to Attachment 3.

5. Information on environmental analysis, if needed.

An environmental assessment is not necessary for the proposed rules contained in this Green Sheet package as it is a Type III action.

6. Final Regulatory Flexibility Analysis.

The proposed rule does not have significant economic impact on small businesses. The facilities affected by the proposed rules are large industrial facilities and municipal wastewater facilities.

7. Agency Contact Person

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Attachments:

Attachment 1: Response to Public Comments & Feedback

Attachment 2: Rational for Establishment of Temperature Limitations for POTWs

Attachment 3: USEPA Letter from Tinka Hyde to Todd Ambs dated March 6, 2009

Attachment 4: Fiscal Estimate

Attachment 5: Rule Order

Cc: Marney Hoefler – LS/8
Todd Ambs – AD/8
Russ Rasmussen – WT/3
Bob Masnado – WT/3

Response to Comments Received on

Proposed Revisions to Chapters NR 102 & NR 106 (Wis. Adm. Code)

Thermal Water Quality Standards & Associated Water Quality-Based Effluent Limitation Calculation Procedures for Discharges to Surface Waters

March 2009

Note to Reader: In January 2008, the Department of Natural Resources held public hearings on proposed revisions to Chapters NR 102 and NR 106 of the Wisconsin Administrative Code. Following those hearings, comments were received that resulted in changes to the draft rules. Those comments are summarized below. An additional public information meeting was held in January 2009 to summarize the resultant changes for any and all interested parties. As a result of that meeting, additional changes were made to the rule package. Comments received as a result of that meeting and the Department's responses are provided in the Addendum to this document.

Results of January 2008 Public Hearings:

Public hearings were conducted in January 2008 on the proposed revisions to Chapters NR 102 and NR 106 as they related to the establishment of thermal water quality standards and implementation of those standards in WPDES permits. Those comments were compiled and summarized as noted below. Department staff considered those comments when determining whether additional revisions to the proposed rules were warranted. Responses below indicated whether or not a change was made and provides a general reaction to the noted comment.

Following a series of "general" comments, the remainder of comments and response are organized alphabetically by topic. A list of all parties making comments is provided at the end of this summary.

GENERAL COMMENTS

1. Comment: This rule revision effort was undertaken because DNR wants a stricter rule.

Response: This rule-making effort was not undertaken because WDNR wanted a stricter rule. It was done because the Wisconsin Supreme Court made a very unique ruling that invalidated the provisions of Chapter NR 102 (Wis. Adm. Code) that related to the application of thermal water quality standards. Because of the ruling, it was necessary for WDNR to develop new rules in order to be able to issue WPDES permits with valid heat limits to ensure the safety of humans, fish and other aquatic life exposed to the discharge of heated water.

2. Comment: Why do we need these rules revisions? We do not see any environmental problems now.

Response: Under extreme circumstances, the common observable effect of discharging hot water would be fish kills. WDNR has not documented a large number of heat-related fish kills over the years. However, it is important to note that the Clean Water Act is not based solely on having dead fish to indicate harm. Instead, it is based on maintaining ecological integrity which requires protection against death or immobilization as well as risk to reproduction and/or growth of aquatic organisms. The rules proposed are designed to meet the goal of providing protection to humans as well as to allow the natural biological functions of fish and other aquatic life communities to occur without risk of adverse impacts to the discharge of heated water. The proposed rules establish clear and consistent standards and processes for addressing existing and future discharges of heated water to meet that goal.

3. Comment: DNR perceives itself to be legally obligated to promulgate thermal rules and is proposing rules because USEPA has demanded it, not because of any underlying technical justification.

Response: Heat is a pollutant and can have an adverse effect on aquatic life. To protect surface waters from these impacts, water quality standards for heat are appropriate and necessary. To meet the statutory requirements, WDNR needs to promulgate revised thermal rules to replace the rules struck down by the Wisconsin Supreme Court (see response to general comment "1"). Alternatively, WDNR can allow USEPA to issue permits with temperature limits to appropriate facilities. WDNR would prefer to issue these permits at the State level, rather than rely on EPA to do so. WDNR believes Wisconsin permittees prefer this as well. Through the advisory committee, every effort has been made to assure the proposed rules would be as reasonable in their implementation as possible.

4. Comment: The proposed rules do not address how effluent limits will be established for discharges to waters subject to an existing variance under NR 104. Clarify whether dischargers to variance waters can receive alternative effluent limitations.

Response: Language has been added to clarify that waters identified under NR 104.06(2)(b) can receive alternative effluent limitations.

5. Comment: Changes to NR 102.04(1) should not be made because rule changes should continually increase protections for waters, not backslide and reduce protections.

Response: The deletion of effluent channel from NR 102.04(1) does not weaken the legal protection of Wisconsin waters. The deletion is intended to remove an inconsistency with ch. NR 102's purpose stated in NR 102.01(1) and the definition of surface waters in NR 102.03(6). The purpose of chapter NR 102 is to regulate 'surface waters.' The definition of surface waters does not include effluent channels since they are not 'naturally flowing streams'.

6. Comment: Why are there so many site-specific options in the proposed rules? Why not make it simpler by offering only a set of default conditions?

Response: Site-specific options exist throughout the proposed rules because it is impossible to develop reasonable default conditions in the rules for every discharge scenario and water body type. To a large extent, the provisions for site-specific flexibility mirror those that are available for the regulation of other pollutants in Wisconsin's water quality standards.

7. Comment: It's unclear if impoundments should refer to Table 3 or 4 in NR 102.

Response: Water bodies identified as impoundments are those that have a water residence time of greater than or equal to 14 days. Those water bodies are covered under s. NR 102.25(4) and Table 4.

8. Comment: The natural avoidance mechanism of fish to sense heat and swim away should be considered.

Response: Water quality criteria are derived assuming worst case scenarios where organisms are assumed not capable of such avoidance reactions. In fact, some aquatic organisms that are to be protected under these rules are not capable of swimming away to avoid heated effluents. However, consideration of natural avoidance may be an element of the analysis presented in each permit issuance or through an AEL demonstration under NR 106, Subchapter VI.

GENERAL – DEFINITIONS & TERMS

9 Comment: The term "weekly average temperature" and its definition are confusing and should be clarified.

Response: WDNR believes the definition included in the proposed rule is accurate.

10. Comment: The conversion factor for calculating a WQBEL for a lake should be changed from 8,360,000 to 8,345,000.

Response: Comment noted and the change has been made.

11. Comment: Amend NR 106.67 to read “shall” specify.

Response: The comment actually refers to NR 106.57. The comment as it applies to NR 106.57 has been made.

12. Comment: In NR 102.23(1-5) replace “may” with “shall”, as required by the Clean Water Act.

Response: Comment noted and the change has been made.

GENERAL – LEGAL ISSUES

13. Comment: DNR must either implement current thermal water quality criteria or must immediately promulgate thermal water quality criteria. Until this is done WPDES permits must not be issued to any dischargers of heated effluent.

Response: Comment noted. This is one of the key reasons why WDNR this rule effort was undertaken.

14. Comment: Revised water quality standards (WQS) are not effective for Clean Water Act purposes until they have been approved by U.S. EPA. This includes site-specific criteria.

Response: A “Note” has been added after NR 102.27(1) to document this fact.

15. Comment: Changes to use designations are necessary, in particular those under limited aquatic life in NR 104, and the related notion that use attainability analyses (UAAs) need to be conducted to demonstrate that attaining a designated use is infeasible.

Response: WDNR is in the process of developing working guidance to staff for the conduct of UAAs. Furthermore, use designation revisions will be undertaken as staff resources allow over the course of the next three years consistent with the recent prioritization of this effort under WDNR’s Triennial Standards Review Process. Any decisions related to changes in use designations – including UAAs – will be subject to public comment, Legislative approval, and federal approval as required by state and federal law.

16. Comment: The Wisconsin Supreme Court’s WEPCO case ruling was narrow in scope, and thus many of the Department’s assumptions related to it are incorrect. In summary, until and unless new or revised thermal water quality standards are promulgated and approved by USEPA the DNR must include discharge limitations in WPDES permits necessary to meet state water quality standards for temperature found at NR 102.04(4)(b)1., 2., and 3.

Response: WDNR Legal Counsel has interpreted the Wisconsin Supreme Court decision to broadly apply to the provisions of NR 102 related to water quality standards for heat. As such, this rule revision effort is intended to avoid the need for selective interpretation and to allow common application of the thermal standards for all applicable discharges of heat.

17. Comment: Protection of existing uses requires protection of natural background dissolved oxygen and temperature levels that existed on Nov. 28, 1975; delete the words “or ambient” in NR 102.04(4)(b).

Response: No changes to dissolved oxygen criteria have been proposed as a part of this rule revision. The provisions to maintain natural background concentrations for dissolved oxygen are intact and unchanged. The phrase “or ambient” has been deleted.

ALTERNATIVE EFFLUENT LIMITATIONS (AEL) – CLEAN WATER ACT SECTION 316(a)

18. Comment: Subchapter VI is vague and needs clarification/guidance.

Response: WDNR will develop additional guidance relating to implementation of this subchapter. USEPA has also published regulations and guidance for establishing alternative effluent limits under § 316(a) of the federal Clean Water Act.

19. Comment: Clarify “relevant evidence” in NR 106.74(1) and (2).

Response: The phrase “relevant information” in these two sections has been changed to read “relevant evidence” as the term is defined in the rule.

20. Comment: Clarify “relevant evidence” in NR 106.74(1) and (2).

Response: The phrase “relevant information” in these two sections has been changed to read “relevant evidence” as the term is defined in the rule.

21. Comment: Include the same zebra mussel control provisions in Subchapter V within Subchapter VI.

Response: Rule language has been modified to add a provision (NR 106.74(3)) that allows short-term temperature excursions for zebra or other mussel control when alternative limits are established.

22. Comment: How will an existing alternative effluent limitation (AEL) be handled/treated?

Response: Under the “relevant evidence” provision associated with the application for an alternative limit, a permittee may submit historical information to demonstrate that a less stringent limit should be included in a permit. Any prior determinations in this regard may be used as part of the application together with any new information. There is no provision in law that an alternative limitation granted under § 283.17, Wis. Stats., continues in subsequent permit terms. Decisions on alternative limits will be required, under NR 106, Subchapter VI, at each permit reissuance.

23. Comment: There is no guarantee an AEL will be granted – this should be changed.

Response: An AEL is not simply granted because a request for one is submitted. Granting the alternative limit will be done on a case-specific basis using the evidence presented in the application. Any decision to grant or not grant an alternative limit is subject to review under the provisions of chapter 283, Wis. Stats.

24. Comment: Is there a real need to require the submittal of the representative important species (RIS) list with the AEL application?

Response: Yes, the selection of RIS is a component of federal regulations (40 CFR 125, Subpart H) and will be used in determining the alternative limits.

25. Comment: An AEL should not be allowed for new discharges/facilities.

Response: State statutes (See § 283.17, Wis. Stats.) do not include provisions which prohibit consideration of an AEL for new dischargers.

26. Comment: Subchapter VI fails to comply with mandates requiring a public hearing prior to AEL determination.

Response: The process created in NR 106, Subchapter VI, is consistent with the permitting processes under other provisions of statute and rule and is a more efficient means to establish limitations. Rather than issuing a permit with temperature effluent limitations and then allowing a permittee to petition for establishment of alternative limitations, it is more efficient to have the permittee apply for the alternative limits at time of permit

application, thereby avoiding a redundant permitting process. The processes under NR 106, Subchapter VI allow for those who may disagree with the establishment of such alternative limits to petition for a review of the permit under the provisions of § 283.63, Wis. Stats., and also present evidence at the time the permit is public noticed.

27. Comment: Assure that NR 106.74 protects existing and potential uses of the receiving waterbody.

Response: Section 283.17, requires that establishment of alternative limits be based on assuring "...the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is made."

AMBIENT TEMPERATURE

28. Comment: Ambient temperatures are greater than acute or sub-lethal criteria, or cap limits.

Response: This comment is in reference to actual site temperatures, whereas the proposed rule contains default ambient temperatures that are best estimate monthly temperatures for different water body types across Wisconsin. Section NR 102.26 establishes a process for developing site-specific ambient temperatures. These values are then used to establish acute and/or sub-lethal criteria which never exceed the ambient value. Parties wishing to have alternative ambient temperatures used to calculate WQBELS may submit those data according to the conditions of the proposed rule. Note: The "cap limits" provision has been removed from the rule.

29. Comment: DNR should regularly review/update our ambient temperatures to ensure the default ambient temperatures in NR 102.25 remain representative of the waters of the State.

Response: To the degree feasible, WDNR will use representative continuous temperature data collected routinely by WDNR biologists and select others to update ambient temperatures as appropriate.

30. Comment: Ambient temperatures in southern Green Bay have been observed to exceed the proposed acute criteria. Further, several daily maximum and weekly average intake temperatures have been observed above the sub-lethal water quality criterion. If actual ambient temperatures are as high as, or greater than, the criteria, then effects should have been observed – such as massive die-offs of fish and aquatic life. It is logical to conclude that this is due to the ability of aquatic life to acclimate to its surroundings, which is something that must be accounted for when calculating limits.

Response: Ecological problems will not always be as obvious as fish kills – nor are those obvious impacts the sole standard upon which statutory protections are based. It is not known that many organisms can acclimate to some degree to changes in temperature and some of that may occur in Lower Green Bay.

Further and as noted in earlier responses, the proposed water quality criteria are based upon a compilation of data for large population of fish species exposed to heat in laboratory settings. The criteria are believed to be protective of natural communities at the threshold temperatures derived from those analyses. Reliance on more general *statewide* criteria is due in part to the inability of WDNR to establish site-specific criteria for every lake, river, or stream in the state. Similarly, use of default background temperatures to presume ambient water temperature is a function of staff and monitoring resources within WDNR. Where it can be demonstrated that the proposed criteria or ambient temperatures are not appropriate, several options are available to establish a site-specific criterion or to demonstrate that alternative considerations must be made to account for the localized assimilation of heat.

31. Comment: The definition of ambient temperature needs to be more protective (include reference to non-point thermal influences).

Response: The calculation of ambient temperatures was based on data collected at a number of sites throughout the state and included both dry periods as well as periods of precipitation and associated runoff. Influences from nonpoint sources were inherently integrated into the derivation of these ambient

temperatures. The definition recognizes this and ensures that point sources - including permitted municipal separate storm sewer systems (MS4) – are not considered in establishing ambient temperatures.

CAP LIMITATIONS

32. *Comment:* The “cap limits” in the proposed rules should be removed because they are overly and unnecessarily restrictive, provide virtually no mixing allowance and ignores assimilative capacity, are arbitrary, lack adequate support/justification, and limits or eliminates the usefulness of the water quality-based approach within the rest of the rules. Further, the “cap limits” will require a wide range of unnecessary and significant costs, such as capital, operation, and maintenance costs, significant increased costs in electricity, and increased likelihood of an energy emergency, and substantial upgrades to power lines. Together, it is expected that the “cap limits” will lead to a competitive disadvantage for Wisconsin businesses, and be costly for consumers – and all for an approach that is overly conservative. Finally, much of the flexibility implied in the proposed rule is overstated or nonexistent due to the “cap limits”.

Response: For the most part, the “cap limits” have been removed from the proposed rules. For flowing receiving waters, a flow-based matrix has been developed to direct WDNR staff as to which types of limitations may be warranted for WPDES permittees. WDNR believes the flow-based matrix is a much better alternative than “cap limits” and will reduce the following weakness associated with the “cap limits” approach to regulation:

- a) Cap limits are contrary to the strict water quality-based approach WDNR and others worked hard to develop in the rules;
- b) Cap limits are overly conservative in many cases;
- c) Cap limits will lead to an unnecessary increased workload for both WDNR and the regulated community;
- d) Cap limits will lead to unnecessary increased costs for the regulated community; and
- e) Cap limits revert to an approach not conceptually different from the one the Wisconsin Supreme Court ruled invalid.

In addition to the flow-based matrix, WDNR has included rule language that allows more stringent limitations to be imposed for any discharge scenario where there are credible reasons to believe that lethality may occur in a mixing zone that would be detrimental to the biological community.

33. *Comment:* Lethal conditions must not exist outside an area of rapid mixing. The “cap limits” ensure the receiving water will be protected from lethal conditions, and will prevent mixing zones from becoming too large.

Response: While “cap limits” could prevent lethal conditions in rare circumstances, WDNR believes they do so in an overly burdensome and unnecessary manner. The calculation methodology for determining effluent temperature limitations to protect against both acute and sub-lethal effects will reduce or eliminate the potential for lethal conditions in a surface water. Furthermore, WDNR has the ability to consider appropriate options on a site-specific basis as needed to provide additional protections. Language has been added in s. NR 102.04(1m)¹ that allows WDNR to address any situation where it is reasonably possible that lethality may occur in a mixing zone. This proposed provision allows WDNR to be more stringent than the flow-based matrix requires on a cases-by-case basis.

34. *Comment:* The “cap limits” will not protect against lethality in winter months.

Response: This comment appears to be based on an incorrect assumption related to the application of the “cap limit” approach. Under the “cap limits” approach, the calculated acute water quality-based effluent limitations (WQBELs) would be used during winter months, not the “cap limits.”

¹ The provision added in s. NR 102.04(1m) following the January 2008 public comment period was moved to s. NR 102.04(4)(e) for the final proposed rule.

35. Comment: There is no information indicating/supporting a national effort or need for end-of-pipe “cap limits”.

Response: “Cap limits” have been removed from the proposed rule and a flow-based matrix has been included as an alternative. See s. NR 106.55(6).

36. Comment: “Cap limits” address concerns that acutely toxic conditions could exist in WQBEL mixing zones.

Response: WDNR believes “cap limits” may be unnecessary in most cases and has proposed an alternative to restrict maximum temperatures where the potential for acutely toxic conditions is most likely. The use of “cap limits” to reduce lethality in a near-field mixing zone is grounded in guidance documents relating to toxic pollutants which act in a very conservative manner when considering their environmental fate. Heat is not a conservative pollutant and dissipation to levels that do not result in acute effects is common under most discharge situations. A new provision under s. NR 102.04(1m)² has been included to provide WDNR the authority to impose more stringent limitations than otherwise calculated by rule when it is determined that there is a reasonable chance the lethality due to heated water may occur in a mixing zone.

CRITERIA: ACUTE

37. Comment: Temperatures above the acute criterion do not automatically equate to lethality.

Response: Agree. The acute criteria were not based on immediate (or very short-term) death following placement into test chambers. The acute criteria are based upon an Upper Incipient Lethal Temperature (UILT) which is representative of the response of organisms held at constant test temperatures for 0-10 days until 50% mortality in the test population was observed. USEPA’s reference to guidance documents stating the need to eliminate or significantly restrict acute mixing zones is based on concerns of immediate or very short-term lethality. The UILT endpoint does not truly represent immediate or very short-term lethality. The *Ultimate* UILT (UUILT) would be the more appropriate endpoint to represent immediate lethality, however there are far fewer UUILT data available making development of sensible instantaneous lethality criteria nearly impossible.

38. Comment: Proposed acute criteria fail to adequately protect fish spawning in Wisconsin’s waters, and must be revised.

Response: The acute criteria do not adequately protect fish spawning and they are not intended to. Acute criteria are a measure of lethality, not spawning thresholds. The proposed sub-lethal criteria are intended to protect fish spawning and other sub-lethal endpoint.

39. Comment: The acute criteria should be calculated using a more biologically protective endpoint than the median UILT which leave 50% of the species vulnerable to mortality.

Response: Three specific responses to this comment can be made. First, the comment is based on an incorrect assumption that the acute criteria are equivalent to the maximum survival temperature, or the highest possible temperature at which a species can survive. Second, there is not likely to be a problem with the acute criteria when considering they are proposed to be applied in combination with sub-lethal criteria, the public health and welfare criterion, and specific mixing zone provisions. Third, an established safety factor was applied to the UILT values as a part of the development of the acute criteria.

CRITERIA: SUB-LETHAL

² The provision added in s. NR 102.04(1m) following the January 2008 public comment period was moved to s. NR 102.04(4)(e) for the final proposed rule.

40. Comment: Spawning data [used to develop the sub-lethal criteria] are the maximum temperatures a fish could tolerate and still reproduce.

Response: This statement is not correct. The spawning data used in developing the criteria came from field observations of WDNR fishery biologists and are somewhat anecdotal in nature. They represent the temperatures or highest temperatures at which given fish species were observed spawning. They are not results of specific research designed to determine “maximum” thresholds. They are, however, the best available data for the development of the spawning portion of the sub-lethal criteria. Thus, the spawning criteria do not represent the maximum temperatures fish could tolerate and still reproduce. They provide the best basis for developing truly water quality-based sub-lethal water quality criteria, and are protective since they are used in combination with mixing zones provisions (some that are specific to protect spawning).

41. Comment: Sub-lethal criteria are based largely on spawning data.

Response: Three types of data used to develop the sub-lethal criteria:

- a) Gametogenesis – the production of eggs and sperm within individual organisms,
- b) Spawning – the physical conditions that support the successful laying of fertilized eggs that hatch into viable larvae, and
- c) Growth – the growth of larvae to adult life stages suitable for reproduction.

While there were more temperature data directly related to spawning than for gametogenesis and growth, the proposed criteria were based on combining and fitting all three types of data endpoints together in a manner that made ecological sense in Wisconsin. Thus, no one type of data weighed more heavily than another in developing the sub-lethal criteria.

COMPLIANCE WITH LIMITATIONS

42. Comment: The compliance schedule proposed in NR 106.62 should be extended from 3 years to 5 years (to be consistent with existing NR 106.117). Three years is an inadequate timeframe to meet compliance; five years is more appropriate.

Response: Federal law requires schedules of compliance to be as short as reasonably possible (See 40 CFR 122.47). Changes were made in the draft rule to recognize that it is possible for a compliance schedule to extend as long as the term of the permit if determined necessary on a case-by-case basis. A similar provision was added in Subchapter VI to allow for a compliance schedule to meet an alternative limitation.

43. Comment: Since compliance with a sub-lethal WQBEL is calculated using a 7-day rolling average maximum effluent temperature, compliance with the sub-lethal WQBEL should also be based on the 7-day average Qs and Qe.

Response: There comment appears to reflect a misunderstanding or misreading of the rule. The sub-lethal WQBEL is defined in terms of a calendar week, not a rolling average and the streamflow value is based upon an average over a seven-day period. Effluent flow is defined as the highest value measured for each month. Although the latter value is a conservative estimate, it is offset by the averaging of other values used in the WQBEL calculation or the averaging of the effluent temperatures used in determining compliance.

COOLING TECHNOLOGY

44. Comment: Cooling towers would create a public safety hazard due to the proximity of some facilities to major highways or community – due to fogging and icing.

Response: Permittees that believe there are safety risks associated with cooling towers may request a variance under § 283.15, Wis. Stats., for temperature effluent limitations established under Subchapter V if such limitations will cause widespread economic and social impacts. Public safety hazards caused by

cooling tower drift may, in specific situations, fall within this variance category. Public concerns over operations involving cooling towers submitted as formal comments during the public participation process associated with the issuance of any WPDES permit must be formally addressed by WDNR. Decisions of this nature would need to consider all site-specific and design-specific factors.

45. Comment: Cooling towers are unsightly and disrupt the natural landscape.

Response: It is possible that cooling towers may be the most feasible means to manage heat in some instances. In those cases, the ecological benefits of managing the heated discharges will have to be contrasted against the aesthetics of cooling towers. Any decisions on the inclusion of cooling towers for public utilities will also require approval by the Public Service Commission under Chapter 196, Wis. Stats.

46. Comment: Construction and operation of cooling towers would create substantial adverse environmental effects: increase power use and burden on energy grid, emit unwanted odors or aerosol bacteria, increase noise pollution, water evaporation, increase use of chemicals, and increase land consumption and conversion of wetlands and other protected lands.

Response: See responses to Comments #44 and #45.

COOLING WATER INTAKE – CLEAN WATER ACT SECTION 316(b)

47. Comment: In order to better understand the cooling water intake structure compliance options, the DNR should coordinate finalization of the thermal rules with U.S. EPA's 316(b) rules.

Response: Although there is a connection between thermal rules and cooling water intake structure regulations, WDNR believes the impacts are sufficiently different such that separate rules can apply. In addition, these connections can often be addressed under the AEL provisions of NR 106, Subchapter VI.

DEFAULT CONDITIONS

48. Comment: The default conditions in the proposed rules, especially those related to the “cap” limits, force an alternative effluent limit (AEL) to be conducted. Also, the AEL process is burdensome.

Response: Two responses are appropriate: 1) While the AEL process may be burdensome compared to no limitations for temperature in permits (as has been the case in Wisconsin since 1975), the AEL approach is the formal process implemented across the country under the authorities of Section 316(a) of the federal Clean Water Act. In fact, it is the standard approach used by power plants nationally. Many Wisconsin companies conducted such studies in the 1970s, concluding, in most instances, that heated discharges were not adversely affecting aquatic life. The proposed rules will require updated studies to demonstrate if the historical conclusions are still valid. 2) The proposed rule includes a variety of site-specific options that are alternatives to, and often less burdensome than, the AEL approach. There is no indication that any other state has the types of built-in site-specific options proposed in these rules, which provide for more flexible water quality-based regulatory approaches.

49. Comment: Why are the default standards and resulting effluent limits for limited aquatic life (LAL) waters similar to or more stringent than those for other waters?

Response: LAL waters are usually small and do not have the flow and assimilative capacity to accept discharges without an adverse effect on the aquatic life in those waters. Additionally, the comment infers that LAL waters are of a lower quality and should not need to receive the same level of protection as cold waters or warm waters. This is part of a long-standing misconception that cold waters = high quality, warm waters = medium quality, and limited forage fish (LFF) and LAL waters = low quality. Instead, each of these types of waters is only capable of supporting a certain type of natural community of fish and other aquatic life. Where sufficient natural flow is available and the water temperatures are cold, a cold water fish community is expected. Generally speaking, a community of non-fish organisms may be expected to

dominate those water bodies where natural flows are low and not supported by springs, water temperatures are naturally warmer, and habitat is limited due to natural features. Those types of water bodies may be appropriately classified as a *limited aquatic life* community and the organisms that occupy it also are subject to the protections of the proposed rule. In some cases, the organisms expected to be found in a *limited aquatic life* community are less tolerant to heat than some fish species found in other community types.

DOWNSTREAM WATER PROTECTION

50. *Comment:* As per CWA, ensure that water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

Response: This provision is contained in the rule at NR 102.01(3) and at several locations in NR 106 as reflected in prior responses to comments.

51. *Comment:* Ensure that any discharge via a wastewater effluent channel is protective of downstream waters/uses. The draft rule does not clearly require this determination to be made.

Response: WDNR believes this comment is addressed by the language proposed for s. NR 106.56(9).

EMERGENCY OPERATIONS & ELECTRICAL RELIABILITY

52. *Comment:* A FERC operating emergency plan must include plans to seek removal of environmental constraints that would prevent a power plant from being able to provide maximum generating capacity during an energy emergency. The proposed rules would have the effect of limiting power plant output during peak electrical demand periods – loss of generating capacity during peak demands presents a hazard to the public. Recommended language was submitted for NR 102 that permits temporary exceedance of thermal discharge limitations in order to prevent collapse of the electrical transmission and distribution system during and energy emergency as declared by MISO. Additionally, any energy emergency provisions should be extended to Subchapter VI.

Response: WDNR understands that nature of the request, but does not believe it is appropriate to include the proposed language in the proposed rule and most definitely not in Chapter NR 102. Instead, a “Note” has also been included in s. NR 106.51 that states WDNR will use its enforcement discretion in regards to permit obligations whenever an “energy emergency” is declared under the provisions of the Energy Policy Act of 2005 and/or orders issued by the Federal Energy Regulatory Commission.

53. *Comment:* Revise the rules to achieve the mutually compatible goals of ecological protection and electrical reliability.

Response: WDNR believes the newly proposed revisions will be ecologically protective and not prohibit sufficient electrical reliability.

ECONOMIC IMPACT

54. *Comment:* The proposed rules will lead to a competitive disadvantage for Wisconsin businesses with businesses in neighboring states and/or within the global marketplace. Many commenters provided examples of how the rules would create competitive disadvantages. Most of these comments were focused on how “overly conservative” “cap limits” would cause this. However, other commenters simply noted that the rules, generally, would cause competitive disadvantages, and that because of these disadvantages the rules should be significantly revised.

Response: As noted in the response to #1, the Wisconsin Supreme Court ruled against the application of Wisconsin’s current rules found in Chapter NR 102. Those rules were nearly identical to the rules currently used by many other states, including those surrounding Wisconsin. As a result of that ruling, WDNR must

revise the rule package to address the Court's concerns and that requires a very different approach than that used by the other states. In addition, USEPA has provided additional interpretations of mixing zone guidance as it applies to heat and that influenced several provisions in the proposed rule package. In response to concerns over the "overly stringent" nature of the proposed rules, WDNR worked cooperatively with USEPA to ensure that federal expectations are considered while attempting to be as reasonable as possible in the expectations for heat management by permitted dischargers. WDNR believes the approach recommended in this proposed rule package is more flexible than the draft rule package taken out to public hearings. WDNR also believes that the revisions do require more deliberate heat management for those situations that warrant it while providing greater flexibility where heat management is not as critical.

ENERGY CONSUMPTION

55. *Comment:* The proposed rules themselves create an overall environmental impact, or at the very least provide no overall environmental benefit. The rules promote increased use of electricity and increased carbon footprint, and is counterproductive by increasing overall energy consumption and reducing energy efficiency. Additionally, the rules would have detrimental impacts on watersheds, conflict with requirements elsewhere in state and federal law to minimize intake flows and reduce related biological impacts, and promote increased use/loss of water. These issues in turn contradict the Governor's environmental priorities, namely the Task Force on Global Warming, the Great Lakes Water Compact, and the Midwestern Governors Association's Midwestern Greenhouse Gas Reduction Accord.

Response: Although WDNR believes these comments are primarily related to the "cap limits", there are sufficient opportunities within the rules to weigh all these factors as compared to the thermal impacts. WDNR expect some scenarios where including cooling technologies or systems will have real environmental benefit.

GENERAL PERMIT CONDITIONS

56. *Comment:* Numerous comments and suggestions were made regarding the general permit section of the NR 106. Each of the comments is addressed individually below.

Response: Based on several comments received related to general permits, substantial changes have been made to the rule to incorporate many of the suggested changes and to establish more clearly defined requirements for inclusion in a general permit. The intent of these changes is to allow for the establishment of some of the more specific requirements of the proposed rule under the general permit, such as allowing WDNR to include site specific provisions for these discharges when granting coverage under the general permit.

57. *Comment:* Remove the condition regarding ice conditions [NR 106.61(1)(h)] – there is no basis for it.

Response: The paragraph is removed from the proposed rule.

57 *Comment:* Include language allowing a permittee to demonstrate that a general permit (GP) is not needed.

Response: WDNR cannot, by rule, exempt discharges from coverage under the WPDES program. However, WDNR believes the approach in the final rule order addresses this concern.

60. *Comment:* Do not allow a GP for discharges to cold waters.

Response: WDNR believes that most cold water streams are protected under the outstanding resource water and exceptional resource water classifications. Additionally, WDNR believes the approach in the final rule order addresses this concern.

61. Comment: Add language in NR 106.61(1)(c)11 that assures attainment or maintenance of downstream or adjacent water quality standards.

Response: WDNR believes this comment is address by the language proposed for s. NR 106.56(9).

62. Comment: Add a paragraph that assures a discharger to a waterbody listed on the 303(d) list because of temperature cannot receive a general permit.

Response: The determination of permit coverage for waters on the 303(d) list will be made on a case-specific basis using rules and guidance covering this program activity.

63. Comment: Amend NR 106.61(1)(g) to prohibit a GP to discharges containing process wastewaters or pollutants – or to ensure WQSs for all pollutants are met.

Response: The section of the draft rule that address general permits has been modified and includes a provision that prevents such permits from being issued to discharges containing process waters.

64. Comment: Amend NR 106.61 to require reporting of monitoring data at least once per year, as federally required.

Response: Federal rules allow an exception to annual reporting if the permit requires reporting of noncompliance. This latter requirement is a condition of all WPDES permits. The rule requires collection of representative effluent temperatures, but submittal of this data is an optional requirement made at the time GP coverage is granted by WDNR. If not submitted, the data must be available to WDNR at any time.

HUMAN HEALTH PROTECTION

65. Comment: The Public Health and Welfare criterion of 120° F exceeds other codes and standards developed for this purpose.

Response: Other standards for human health protection assume continuous exposure to heated water from appurtenances (i.e., hot tubs, plumbing fixtures) designed expressly for immersion or skin contact. Exposure to wastewater discharged from an outfall into a river or lake or to the land surface would likely be rare and when it did occur would be incidental. The proposed criterion would protect against scalding in the rare instance when human contact with wastewater at the end of an outfall pipe would occur.

LIMITED AQUATIC LIFE USE DESIGNATION

66. Comment: A UAA must be conducted as per the CWA to demonstrate that attainment of fishable/swimmable use is infeasible. Our broad use of limited aquatic life (LAL) for this purpose is not acceptable.

Response: This rule revision effort does not address the manner in which use designations are assigned and approved. Furthermore, the original scoping statement did not include any provisions authorizing WDNR to address such matters. Under the scoping statement requirements of Chapter 227, Wis. Stats, WDNR will seek permission to revise NR 102 in the future to modify procedures used to change use designations, including those affected by federal Use Attainability Analysis requirements.

67. Comment: Amend NR 102.24(3) to remove blanket designation of wetlands and diffused waters as “limited” and apply LAL only to those waters with limited potential to support a balanced and diverse aquatic community based on a UAA.

Response: See response to Comment #66

MIXING ZONES

68. Comment: USEPA's mixing zone guidance is just that – guidance, not law. The guidance is primarily, if not exclusively, aimed at substances that are conservative. Heat is not conservative; it dissipates rapidly. For this reason, application of existing mixing zone guidance is inappropriate for use with thermal discharges.

Response: WDNR agrees in principle and has removed the “cap limits” based in large part on interpretations of USEPA's mixing zone guidance. In lieu of “cap limits,” provisions have been added to NR 102.04(1m) which provides WDNR the authority to impose effluent limitations to prevent lethality in a mixing zone if there are is reason to believe the calculated limitations are not adequately protective.

69. Comment: There is no clarification on how the 7Q10 will be calculated.

Response: The 7Q10 flow is a standard, commonly calculated flow rate. WDNR relies on the United States Geological Survey (USGS) for the calculation of 7Q10 values for water bodies in Wisconsin.

70. Comment: There is no discussion regarding how the Qs:Qe of 100:1 was determined regarding the cap limit. How was this determined?

Response: The 100:1 provision was removed from the proposed rule, together with the “cap limits.” An alternative flow-based matrix in s. NR 106.55(6) has been proposed in response. The actual Qs:Qe ratios proposed are based on a comparison of projected effluent limitations using default input data to stream flow. Using this approach, it was determined that all discharges to warm water with a Qs:Qe ratio of greater than or equal to 20:1 would only be subject to an effluent limitation of 120°F. Similarly, discharges to cold water communities with a Qs:Qe ratio of 30:1 or better did not need a more stringent limitation than 120°F. On the opposite end of the temperature/flow spectrum, both an acute and a sub-lethal limitation would be required because of very limited dilution and capacity for the receiving water to dissipate heat. The Qs:Qe threshold for inclusion of both acute and sub-lethal limits was determined to be 2:1 and 2.5:1 for warm and cold water communities, respectively.

71. Comment: In-place thermal dispersion via site-specific mixing zones and diffusers are much better than single point discharges, and will result in little, if any, adverse impact to either mobile or sessile aquatic organisms. The proposed rules do not provide an exemption for any of these site-specific outfall configurations.

Response: While the proposed rules do not provide an exemption, they do allow facilities that have or would install diffusers or other similar mechanical devices to utilize one of the site-specific options available (see NR 106.55(11)).

72. Comment: There is no evidence the historic 10% mixing zone rule for lakes has contributed to biological impairment due to thermal discharges – thus keep using the historic 10% mixing zone rule for lakes rather than set sizes in NR 106.55(7)(b) AND/OR remove the size restrictions in NR 106.55(7)(b), as they are very conservative. Great Lakes mixing zone size limits are not supported by the mixing zone requirements of NR 102.05(3).

Response: Several points need to be made in response. First, it is important to note that NR 102.05(3) (referred to in the comment) provides a list of conditions that are to be “a guide to the delineation of a mixing zone ... [that] shall be taken into consideration.” Thus, these conditions are not “requirements” to be followed in all circumstances. Second, the rule provision at NR 102.05(3)(e) pertains only to inland lakes, not the Great Lakes. Third, the proposed rules include the option to establish a site-specific mixing zone based on a mixing zone study. Finally, the response to general comment “2” applies to part of the comment. No changes were made to the proposed language.

73. Comment: The proposed mixing zone is very conservative – it does not consider heat loss to both the atmosphere and to adjacent waters simultaneously.

Response: It is true the mixing zone considerations for heat loss are conservative. The primary reason for this is that the limit calculation is a two-dimensional model. The advisory committee considered this issue numerous times and was open to alternatives that were more “realistic.” However, no alternatives were offered that would better serve as a default or starting point for application in the rule. While some permittees will have the data, funding, and desire to use modeling to calculate their limits, most will not. WDNR cannot conduct site-specific modeling as a default approach to setting mixing zone dimensions, especially since it will not be that critical for most dischargers. Furthermore, this is a large part of the reason numerous site-specific options were made available as alternatives to the default conditions, including the use of site-specific models to calculate site-specific limits.

74. Comment: USEPA’s mixing zone concerns seem to be surfacing in isolation, without regard for practical realities of discharges or the interaction of other regulatory elements.

Response: See response to Comment #32.

75. Comment: Any alterations to a mixing zone must be established in NR 102.05(3), not NR 106.53(3)(c). Qs should not be altered (as allowed in NR 106.53) to accommodate requested alternative mixing zones. DNR must not improperly alter mixing zones by imposing less stringent limits in permit based on fabricated Qs.

Response: NR 102.05(3) (referred to in the comment) provides a list of conditions that are to be “a guide to the delineation of a mixing zone ... [that] shall be taken into consideration.” Thus, these conditions are not “requirements” to be followed in all circumstances. Further, NR 102.05(3) are guideline considerations to be considered for all scenarios, whereas NR 106.53(3)(c) provides specific direction to those considering a site-specific approach to dealing with thermal discharges. WDNR allows site-specific considerations (such as stream flow and mixing zones) within the proposed rules, and feels strongly these do not equate to “fabricated” Qs values. In fact, site-specific considerations – when appropriate and representative data are available – can yield more realistic regulatory limitations.

76. Comment: The amount of Qs needed to achieve the acute and sub-lethal criteria is relatively small, thus additional restrictions on mixing zones are not warranted.

Response: The proposed Qs:Qe ratio approach in the revised rules package acknowledges this point and focuses increased regulation in scenarios expected to need it. Removal of the “cap limits” also addresses this comment.

77. Comment: Modify NR 106.55(6)(b) and (d) to specifically allow the use of 4Q3 flows.

Response: This option is allowed under the proposed rule.

78. Comment: The use of Qs values determined on an individual monthly basis should be allowed.

79. Response: This option is allowed under the proposed rule.

80. Comment: Allow the use of full Qs when discharges are to side channels of the main river OR allow use of the main river Qs, rather than the Qs of the side channel. We urge the Department to allow the full $\frac{1}{4}$ 7Q10 of the river in situations like this. For example, a facility has three outfalls, including one that discharges to a side channel of the Wisconsin River. Shortly downstream of the outfalls, the side channel rejoins the main channel. Under these unique circumstances, it is unclear exactly how the 7Q10 of the Wisconsin River should be calculated. The practical effect of this scenario is that use of anything other than the full Wisconsin River 7Q10 flow will force this facility to construct a cooling tower.

Response: There are two responses to this comment. First, WDNR does propose to use the $\frac{1}{4}$ 7Q10 as a default, not the full 7Q10. Second, this example is exactly why the proposed rules include numerous site-specific options. As stated in the comment, this is a “unique” scenario, and thus, by definition, is not a “default” scenario. If it can be demonstrated that something other than a $\frac{1}{4}$ 7Q10 can be used in the side

channel and still be protective of aquatic life in both the side channel and the main river, then it can be considered for approval by the permit drafter. Site-specific mixing zone studies or modeling approaches are examples of tools that can be used in this demonstration. Any decision to construct a cooling tower would not be prudent until the allowable Qs were determined based upon site specific data.

81. Comment: Using $\frac{1}{4}$ 7Q10 for Qs is conservative. What is the basis for this? Was there any scientific consensus or reasoning to support it?

Response: The selection of $\frac{1}{4}$ 7Q10 is linked to the guidelines used to establish mixing zones in s. NR 102.05(3). Along with a goal of limiting mixing zones to as small an area as practicable and providing passage for aquatic organisms, there is a provision that encourages the use of 25% of the cross-sectional area or volume of flow. This guidance has been used as a starting point for using a fraction of the 7Q10 flow values for many years. If a permittee believes this value is too restrictive, there are several options available to seek relief by providing WDNR with site-specific data to be considered in the selection of the Qs value.

82. Comment: Allow permittees to use Qs data from USGS rather than installing their own gauges.

Response: This is already allowed for in the proposed rule. Flow values provided to WDNR directly from USGS are commonly used as the primary value for the derivation of effluent limits. Nothing in this rule proposes an alternative approach.

83. Comment: Would a site-specific mixing zone require promulgation? Clarify.

Response: Promulgation of a rule revision is not required to utilize the site-specific mixing zone options within a WPDES permit. Approval by WDNR would be noted in a letter to the requestor and the site-specific allowances would be considered in the determination of applicable effluent limitations. However, this decision must be concluded prior to permit issuance since it is reviewable under the public comment provisions of the WPDES permit program.

84. Comment: Revise NR 106.55(7)(b) to allow for mixing zones (in particular those in inland lakes) to be calculated on a case-by-case basis using NR 102.05(3).

Response: This is already allowed under NR 106.55(7)(b) – a site-specific mixing zone can be substituted for the listed default mixing zone areas for any inland lake or impoundment or Great Lake water.

85. Comment: Clarify that thermal standards are to be applied at the edge of an appropriate mixing zone.

Response: This statement is made in NR 102.05(3)(intro.).

PUBLICLY OWNED TREATMENT WORKS (POTWS)

86. Comment: There is no analysis or support for the POTW variance findings provided.

Response: NR 106.59 has been substantially revised from that which was proposed. An attachment contains supporting document for the provision in the rule order.

87. Comment: Use monitoring of a subset of facilities to determine if POTWs need to be included in the rule.

Response: WDNR has produced further documentation to support its proposed action for temperature limitations for POTWs. This document contains information on effluent temperatures and potential impacts of POTW heat discharges on surface waters.

88. Comment: Several different, but related suggestions are provided. If 2-years of data demonstrates the effluent limit is not necessary, then continued effluent temperature monitoring should not be required. NR 106.59(6) should be amended to require every point source to monitor effluent temperature to be in compliance with state law that requires every permit holder to establish and maintain records of the volume

of each discharged pollutant, and to regularly report this information to DNR. NR 106.56(10)(b) should be amended to limit monitoring to a period of not longer than one year, and to require data collection at least twice per week.

Response: There is very little current information on effluent temperature for many discharges in the state. WDNR believes there is a great amount of variability between dischargers and also significant variability in daily, weekly or seasonal temperature values for some dischargers. Because of this uncertainty, WDNR believes that this rule should be flexible so that case-specific decisions can be made concerning monitoring frequency and length of time to monitor so as to identify any such variability. Permittees and other interested parties may dispute proposed monitoring requirements when permits are issued, or may request permit modifications to change the monitoring requirements. Lastly, current thermistor technology allows for the collection of temperature data at relatively low cost with little effort.

89. *Comment:* Several different, but related suggestions are provided and include the following:

- All the POTW variance findings apply with equal force to new facilities – there is no evidence that the cost for implementing thermal cooling is any less expensive or burdensome for new facilities.
- A POTW variance applicable to both new and existing facilities provides needed flexibility to help maintain watershed integrity (avoid rerouting of water across watersheds) and options for addressing water quantity issues through the beneficial reuse of treated wastewater.
- “Existing POTWs” should expressly include all POTWs that have WPDES permits on the effective date of the rule, no matter, if after that date, outfalls are added or relocated, or if plant upgrades or relocations are undertaken.
- “New facilities” should be expressly limited to only include POTWs that first acquire a WPDES permit after the effective date of the revised rules.
- Any effort to impose “cap limits” should only be applied to new facilities.
- DNR cannot expand the POTW variance to new facilities.
- Amend NR 106.60 to require compliance with WQBELs at new facilities on the effective date of the permit – do not allow an AEL for new facilities.

Response: WDNR believes the rule provisions, as they apply to POTWs, are appropriate and can be implemented effectively. This part of the rule has been revised from that proposed originally. Changes in outfall locations for existing POTWs, as well as outfalls for new facilities, can, in most instances, be sited in places that will allow the facility to meet effluent temperature limitations determined by the rule. Additionally, such proposed discharges may make a demonstration under NR 106, Subchapter VI for an AEL. Further, under the provisions of § 283.15, Wis. Stats., a permittee may request a variance from the water quality based effluent temperature limitations determined under Subchapter V. There are no statutory restrictions on the eligibility of new dischargers for AELs.

90. *Comment:* The original intent was to exclude (publically owned treatment works) POTWs completely from the rules. We recommend a return to this position. POTWs should be exempt instead of having to apply for the exemption.

Response: While it is true that the original intent of this rule effort was to exempt POTWs from temperature limits, both Department and USEPA legal counsel advised that such an exemption is not allowed. The final rule order establishes a process for determining whether effluent temperature limitations for POTWs are necessary and under what conditions such limitations will be included in WPDES permits.

91. *Comment:* Imposing thermal limits on POTWs will result in net environmental loss.

Response: The decision to include procedures for determining if or when effluent limitations are necessary for POTWs is in response to legal counsel guidance that the potential for all discharges to achieve water quality standards must be considered.

92. *Comment:* End-of-pipe wastewater cooling technology for the reduction of heat is expensive for everyone, not just POTWs or privately owned domestic treatment works (PODSTWs). If regard to the cost of installation of cooling water technology is being given to POTWs, then the same deference must be given to all WPDES permittees.

Response: While the costs associated with wastewater cooling technology for the reduction of heat may be significant in particular instances for any entity, WDNR does not agree that all industries should be treated the same as the POTWs and PODSTWs. POTWs and PODSTWs do not add heat to the water that is treated and discharged. Further, the effluent temperatures from POTWs and PODSTWs are consistent and at a low enough level that they generally do not cause harm to the biological community and any heat in the effluent is quickly dissipated. Finally, industrial sources have greater ability to control heat additions to wastewater discharges through reuse, diversion or segregation of specific waste streams, and other in-plant actions.

93. *Comment:* A wide variety of comments were provided regarding effluent limitations for temperature for existing POTWs and PODSTWs, including:

- The variance provisions do not go far enough to avoid the impacts identified in the findings.
- The variance should apply to both new and existing facilities.
- “Existing POTWs” should expressly include all POTWs that have WPDES permits on the effective date of the rule, no matter, if after that date, outfalls are added or relocated, or if plant upgrades or relocations are undertaken.
- Variance provisions need to assure a variance will be received if appropriate actions are taken. Currently the rule does not guarantee this. Greater certainty is needed for proper facility planning.
- Consider instituting monitoring of a subset of facilities for a given period of time to demonstrate actual impact from POTWs, and then revise rules as a need is identified.
- Support continued enforcement to assure a discharge does not exceed 120°F.
- Numerous revisions to the language of NR 106.59 are needed.
- Provide data to support the findings. Absent further justification the broad justifications provided in the proposed rule fail to demonstrate that more stringent controls will result in a widespread economic and social impact. Further, what types of cooling approaches were considered, and what “significant adverse environmental impacts” will be caused?
- Revise NR 106.59(4) to ensure existing uses are protected through effluent limits. The proposed broad variance fails to comply with the CWA. Permits that implement a variance must include limits for the variance parameter that reflect the effluent quality achievable at the time the variance is granted in order to protect existing uses of the waters effected by the variance. The current draft would reissue permits without effluent temperature limitations. Without quantifying the current discharge level in permits it is impossible to determine whether a facility is making reasonable progress towards attaining the designated uses or complying with anti-degradation requirements.
- The only finding remotely related to the thermal water quality standards variance for POTWs is the “substantial and widespread economic and social impact”.
- As per the U.S. EPA WQ Standards Handbook, DNR must ensure that reasonable progress is being made toward meeting the standards.
- As per USEPA’s requirements for approving a water quality variance, amend proposed language to ensure that only one facility on a receiving water segment may operate pursuant to a water quality variance.
- Amend proposed language to prohibit a discharger operating pursuant to a water quality variance from operating pursuant to a variance for any other pollutant.
- As per State law, amend proposed language to limit the term of a variance to 3 years and to require the facility to demonstrate anew its need for the variance.
- As per State law, amend NR 106.59(6) to require effluent monitoring. Without this DNR cannot ensure that reasonable progress is being made toward attaining the water quality standard.
- Amend the variance to ensure existing uses as of Nov. 28, 1975 are protected.
- Do not expand the thermal water quality variance provision to new POTWs.

Response: WDNR has developed additional information in an Attachment to support and explain this provision of the rule. Furthermore, because permits are reissued every 5 years, there can be a review of POTW discharges to determine if the discharge is having a substantial adverse impact to warrant effluent temperature limitations. The section of the rule relating to POTWs has been substantially modified.

RATE-OF-CHANGE

94. *Comment:* Guidance is needed regarding the rate of temperature change.

Response: Guidance regarding the implementation of the rate of temperature change and cold shock standards will be provided once rules are promulgated. This will be included within an Implementation Guide.

REAL-TIME LIMITS

95. *Comment:* Modify NR 106.53(1)(d) to allow for the use of the real-time option.

Response: This paragraph of the proposed rule has been modified to allow use of real-time flow data to establish effluent temperature limitations for specific dischargers.

96. *Comment:* There is confusion regarding how actual ambient temperatures would be used in real-time permitting scenarios.

Response: Guidance on the use of real-time limits will be provided by WDNR following adoption of the rule. Compliance with effluent limitation based on real-time monitoring will most likely require inclusion of flow/temperature tables within a WPDES permit similar to the provisions of NR 212 as they address the discharge of BOD.

97. *Comment:* Real-time data used to calculate a WQBEL should be based on daily data rather than hourly data to be consistent with the process for calculating default WQBELs.

Response: A major benefit and point of using real-time permitting is to enable real-time adjustments in operation, as needed. Daily monitoring does not meet this objective. These were outcomes of advisory committee discussions. Additional guidance on determining compliance and associated reporting requirements will be available following adoption of the propose rules.

98. *Comment:* Change NR 106.53(1)(d) to include an exception for those using a real-time approach.

Response: The proposed rule has been modified to respond to this comment.

REPRESENTATIVE DATA

99. *Comment:* A variety of comments related to the issue of representative data not being available, including:

- NR 106.56(10)(b) would delay making the reasonable potential determination until 2 years of data is collected, and to delay compliance with any necessary WQBELs another 3 years, effectively allowing noncompliance for 5 years. This fails to comply with state and federal law requiring WQBELs based on zero or one data point.
- NR 106.56(10) provides little incentive for permittees with WQBELs less than the cap limit to collect data and comply with true limits.
- Amend NR 106.56(10)(a) to require compliance with daily maximum effluent limits equal to the acute criteria associated with monthly default ambient temperatures.
- Amend NR 106.56(10)(b) to limit monitoring to a period of not greater than one year from the time of issuance/reissuance, and to require data collection at least twice per week.

- Amend NR 106.56(10)(c) to require compliance with necessary WQBELs no later than 3 years after permit issuance/reissuance.

Response: The rule has been revised to reduce the time period for collection of representative data to one year, or a season for dischargers that operate seasonally. The default "cap limits" have been removed and limits are determined using the procedures in NR 106.55. Compliance schedules to meet effluent temperature limitations, if determined necessary, will vary substantially. Permittees that are able to achieve limitations with minor actions may do so quickly; those that require major capital improvements will require a longer compliance schedule. A provision is added to allow a permit modification to establish a different compliance schedule.

STORM WATER

100. *Comment:* Clarify that proposed thermal standards are not intended to affect storm water discharges.

Response: WDNR does not propose to use the procedures identified in the proposed rule to address storm water discharges. Further, while federal law authorizes the regulation of heat as a pollutant for storm water discharges, there currently are no federal permits containing those provisions. For WDNR were to address heat in a storm water discharge, it would need to be done on a case-by-case basis considering all of the relevant facts associated with a specific discharge situation.

WETLANDS

101. *Comment:* Amend NR 102.24(3)(b) to ensure the 86°F criterion be met in all wetlands. Ensure a daily max effluent limit of not greater than 86°F is included in permits.

Response: Permit limitations for discharges to wetlands will be determined on a case-by-case basis (see NR 106.56(7)). WDNR believes this is an appropriate approach to protect wetlands since they are very site-specific.

TROUT STREAM PROTECTION

102. *Comment:* Changes to NR 102.4(4)(e)1. regarding artificial temperature changes in natural trout reproduction streams should not be made.

Response: The proposed criteria were developed to protect natural reproduction, including gametogenesis, spawning, and growth of trout species.

ZEBRA MUSSEL CONTROL

103. *Comment:* Include the zebra mussel control provisions of NR 106.55(6)(a) and (7)(a) in subchapter VI.

Response: Comment noted and the change has been made.

NAME AND ORGANIZATION OF COMMENTERS

Allens, Inc. - Laura Mushinski
Alliant Energy Company (Wisconsin Power & Light Company) - Kathleen Lipp
Anderson & Kent, S.C. - Abigail Potts
CH2M HILL - Mark Mittag
CH2M HILL - Nancy Schultz
Clean Water Action Council - Rebecca Katers
Dairyland Power Cooperative - Michael Peters
DeWitt Ross & Stevens S.C. - Timm Speerschneider
Dominion Resources Services, Inc. - Pamela Faggert
Domtar Paper Company, LLC - Nekoosa and Port Edwards - David Ulrich
Domtar Paper Company, LLC - Rothschild - Terry Charles
FPL Energy Point Beach LLC - Robert Garvin
Friends of Milwaukee's Rivers - Cheryl Nenn
Friends of Milwaukee's Rivers - Lynn Broaddus
Georgia-Pacific Corporation - Jacqueline Powell
Green Bay Metropolitan Sewerage District - John Kennedy
Lodi Canning Company, Inc. - Ken Baars
Lodi Canning Company, Inc. - Bob Goeres
Madison Gas and Electric Company - Michael Ricciardi
Madison Metropolitan Sewerage District - Jon Schellpfeffer
Manitowoc Public Utilities - Nilaksh Kothari
McCain Foods USA, Inc. - Patrick Smith
Midwest Environmental Advocates - Karen Schapiro
Midwest Food Processors Association, Inc. - Nickolas George, Jr.
New Page Corporation - Linda Somers
Packaging Corporation of America - John Piotrowski
River Alliance of Wisconsin - Denny Caneff
SCA Tissue North America, LLC - Michael Dillon
Sierra Club - John Muir Chapter - Eric Uram
Thilmany, LLC - Thomas Jayne
Trega Foods - Mike Sipple
Trout Unlimited, Wisconsin State Chapter - Bill Pielsticker
United States Environmental Protection Agency - Tinka Hyde
Wausau Paper Corporation - Patrick Medvecz
Wausau Paper Corporation - Brokaw - Dan Trettin
Wausau Paper Corporation – Mosinee & Rhinelander - Al Davis
Wisconsin Electric Power Company - WE Energies - Kristine Krause
Wisconsin Environment - Dan Kohler
Wisconsin Industrial Energy Group - Todd Stuart
Wisconsin Manufacturers & Commerce - Scott Manley
Wisconsin Paper Council - Edward Wilusz
Wisconsin Public Service Corporation - Howard Giesler
Wisconsin Section - Central States WEA - Bill Marten
Wisconsin Section - Central States WEA - Jane Carlson
Wisconsin Utilities Association - Bill Skewes
Xcel Energy (NSP-W) - Patrick Flowers

Addendum to:

Response to Comments Received on

Proposed Revisions to Chapters NR 102 & NR 106 (Wis. Adm. Code)

Thermal Water Quality Standards & Associated Water Quality-Based Effluent Limitation Calculation Procedures for Discharges to Surface Waters

March 2009

A public informational meeting was held in Madison, Wisconsin on January 14, 2009 to summarize changes that had been made to proposed revisions to Chapters NR 102 and NR 106 of the Wisconsin Administrative Code as they relate to the development of Thermal Water Quality Standards and associated Point Source Implementation Procedures.

The January 2009 meeting was attended by more than 30 citizens along with a number of WDNR staff. Following a presentation on the changes and a question and answer session, audience members were asked to submit written feedback to WDNR for consideration prior to finalizing the proposed rule package. Feedback was received by 12 different groups representing municipal, industrial, and environmental advocacy interests. A WDNR response to that feedback follows:

1. ***Feedback Received:*** **Central States Water Environment Association – Government Affairs Committee** (Jane Carlson, Jim Kleinschmidt, Nancy Schultz, and Mark Mittag)

- (a) Proposed s. NR 102.24(3)(b): The maximum temperature of 86° may be exceeded by “natural” conditions, particularly related to open, shallow waters. Outcome desired: Okay as long as s. NR 102.26 remains.

Department Response: No changes have been made to s. NR 102.26.

- (b) s. NR 102.25(2) Table 2: What happens if natural conditions violate the criteria? Does that mean NO thermal discharge will be allowed? Outcome desired: OK as long as NR 102.26 remains.

Department Response: The amount of heat that can be discharged is dependent upon the source of the water. If the water supply for the operation was withdrawn from the receiving water, the allowable thermal discharge would need to maintain background temperature. If the water supply was from another source (i.e., groundwater or another surface water), the temperature limit would equal the maximum criterion unless the permittee opted to develop site-specific ambient data in accordance with s. NR 102.26. No changes have been made to s. NR 102.26.

- (c) s. NR 102.25(5) Table 2: Month by month values for Ta, SL, and A could provide greater flexibility by being focused only upon critical seasons for the aquatic community. Situations when other water management issues are also applicable could be considered for more flexibility for when thermal standards need to be met. For example, history shows that the DNR has emphasized the value to maintain water balances to different watersheds. Future discharges to maintain water balances could

be hindered, especially when they are municipal POTW discharges. Outcome desired: Revise NR 105.59 to apply to all existing *and future* POTW discharges.

Department Response: Changes were made to s. NR 106.59 to clearly articulate the differences between managing heat from existing POTWs versus those that are “new” or “re-located.”

Future discharges would include new discharges and they will have to be designed to achieve acute water quality criteria. Furthermore, WDNR will consider dissipative cooling for those facilities similar to how it treats existing discharges so long as the attainment of the use designation of a receiving water will not be jeopardized by allowing the discharge. Otherwise, heat management may need to be considered in the design of the facility. A notable difference between existing and new/future POTW discharges is the lack of actual effluent temperature data to make permitting decisions for the latter. Language was included in the proposed rule that articulates how those data will be estimated through the use of data from nearby existing facilities with similar operations and waste composition.

- (d) s. NR 102.25(5) Table 2 through Table 7: Situations such as growth in harnessing “green energy” through water thermal heating and cooling opportunities may provide receiving water temperature benefits for some seasons of the year, but not meet the standards as proposed for other seasons. It would be unfortunate if an unintended outcome of the proposed regulations hindered the ability to use green energy applications. Outcome desired: Provide a new exception that allows greater flexibility in meeting thermal standards for green energy applications.

Department Response: Relief from meeting standards based on “green energy” was not discussed with the Technical Advisory Committee at any time. Without a full dialogue and a better understanding of how a receiving water would benefit from these types of undefined operations, WDNR will consider this on a case-by-case basis and not include exceptions in the proposed rule package.

- (e) s. NR 102.25(5) Table 5: Where do the temperatures apply? All strata of the water, or vertically averaged, or point temperatures? Desired outcome: Clarify or note other DNR statutes that address this issue.

Department Response: Water quality standards apply throughout the receiving water. Sampling done to determine compliance with water quality-based effluent limitations must be conducted in accordance with the provisions of s. NR 218.07 (Wis. Adm. Code) and the WPDES permit.

- (f) s. NR 102.26(1)(d): Use of the geometric mean to set criteria results in “ambient” conditions exceeding the “ambient criteria”. A criterion that is previously demonstrated to be violated in the ambient condition will unduly restrict discharges to try to address a background condition. Desired outcome: Allow for site specific variation if demonstrated by a preponderance of scientific data—is allowed under NR 106.70.

Department Response: WDNR believes that the provision in s. NR 102.26(1)(g) provides flexibility for the permittee to request an alternative method to analyzing data if there are valid reasons for doing so. Alternatively, a discharger may pursue an alternative effluent limitation, as authorized by Subchapter VI, if it believes that local conditions warrant doing so.

- (g) s. NR 102.26(2): Sublethal criteria calculated from a geometric mean ambient criterion results in sublethal criteria that may not encompass the naturally occurring variations. A criterion that is previously demonstrated to be violated in the ambient condition will unduly restrict discharges to try

to address a background condition. Desired Outcome: Allow for site specific variation if demonstrated by a preponderance of scientific data—is allowed under s. NR 106.70.

Department Response: See response to previous comment.

- (h) s. NR 102.27: No mention of time available to gather data is provided here, especially when this will apply to existing discharges. Since it takes time to gather site-specific data, sufficient time should be provided when dischargers wish to gather site-specific data for determining the criteria. Desired outcome: Provide additional time in the form of one permit cycle to gather site specific data, evaluate data, and develop a process to come into compliance for the next permit cycle.

Department Response: The development of site-specific water quality criteria is generally initiated by a WPDES permittee seeking relief from statewide criteria. The time it takes to complete the requisite studies is neither limited nor justification not to impose water quality-based effluent limits based on statewide criteria if there reasonable potential to exceed those limits is demonstrated. Any permittee considering the development of site-specific criteria should consider the time necessary to obtain the data, and the time it takes for WDNr to review the information and modify the standards through the normal rule revision processes prescribed by Chapter 227, Stats. It should also be noted that WDNr does not intend to implement the thermal standards provisions for all WPDES permittees immediately after promulgation of the rule. Instead, WDNr will review the need for thermal effluent limitations as permits are reviewed for re-issuance.

- (i) s. NR 106.51: “other wastewater to surface waters of the state and that contain an associated heat load or that are elevated in temperature relative to the ambient receiving water” will apply to most municipal stormwater and stormwater affected wastewater discharges. Most stormwater discharges have small tributary areas, now including open detention, which one would expect to have a higher temperature than that in the larger, deeper receiving waters. We understand DNR does not intend to include stormwater discharges in this regulation. Desired Outcome: Add a section in 102.21 explicitly exempting stormwater discharges.

Department Response: The note under s. NR 106.51 articulates WDNr’s position on stormwater. Implementation of the thermal standards for stormwater discharges will be made on a case-by-case basis when, and if, there are representative data indicating that such a discharge is adversely affecting a biological community due to the discharge of heated water. An explicit exemption would not be consistent with the federal Clean Water Act and would not allow approval of the standards package from U.S. EPA.

- (j) s. NR 106.56(10)(1): This provision would severely impact wastewater discharges seasonally, either in the summer, or possibly in the winter as well when discharges have consistent temperature throughout the year. Desired outcome: Consider seasonal default limitations and new POTW discharge exemption.

Department Response: There is no proposed s. NR 106.56(10)(1) in the rule package referred to at the January 14, 2009 public meeting. The version of the draft rule package taken to public hearing in January 2008 contained “cap limits” under s. NR 106.56(10)(a)1., but those conditions have been removed from the latest draft rule package..

- (k) s. NR 106.56(9): The rate of temperature change may already be significant at a site from background sources. Desired Outcome: Provide additional language noting background already occurring temperature variations in NR 102.29.

Department Response: The proposed language was included to ensure that WDNR has the authority to address any activities that “artificially” cause harm to the biological community of a receiving water by raising or lowering the effluent temperature very rapidly. WDNR believes that the provision of s. NR 102.24(2) is sufficient and addresses the comment.

- (l) s. NR 106.59: This section recognizes a reality and makes a necessary exception. However, future POTW discharges will face the same challenges as existing POTWs. Note that many POTWs will not have the resources to perform the necessary studies to obtain the exemption. Desired outcome: Make sure this section remains, but add future POTW and PODSTW discharges to the exemption as well.

Department Response: WDNR is not authorized by state or federal law to “exempt” any discharge from applicable water quality standards. The proposed rules recognize the potential for incidental heat from POTWs to dissipate a short distance from an outfall structure. As written, the rules would require both existing and future discharges (i.e., new or re-located) to compare effluent temperature data to the applicable water quality criteria to determine the potential for exceedences of water quality standards. When those data suggest that acute water quality criteria may be exceeded, a POTW would be expected to manage heat to meet the corresponding effluent limitations. When effluent temperature data suggest that sub-lethal water quality criteria may be exceeded, WDNR may opt to include limitations when there are reasons to believe that the receiving water use designation may not be attained as a result of the new discharge.

- (m)s. NR 106.59: The realities recognized in this section will make it very difficult to permit a new POTW. Desired Outcome: The rules recognize this and offer alternatives, but none will be easy. Add an exemption for new POTW discharges.

Department Response: WDNR is not authorized by state or federal law to “exempt” any discharge from applicable water quality standards. The proposed rules recognize the potential for incidental heat from POTWs to dissipate a short distance from an outfall structure. As written, the rules would require a new discharge to estimate effluent temperature using data from *similar* existing POTWs in the general area of the proposed new discharge. When estimated temperatures suggest that acute water quality criteria may be exceeded, the new POTW would be expected to manage heat to meet the corresponding effluent limitations. When estimated temperatures suggest that sub-lethal water quality criteria may be exceeded, WDNR may opt to include limitations when there are reasons to believe that the receiving water use designation may not be attained as a result of the new discharge.

- (n) s. NR 106.61: The general permit conditions will be difficult to meet with stormwater pond discharges, particularly into cold water fisheries. Desired outcome: Add a section in 102.21 explicitly exempting stormwater discharges.

Department Response: See response to (i), above.

- (o) General: How will these rules apply to stormwater runoff from BMPs currently in place? Any shallow surface water impoundments could violate the acute standard given the right combination of circumstances. Desired Outcome: Add a section in 102.21 explicitly exempting stormwater discharges.

Department Response: See response to (i), above.

- (p) General: How will these rules apply to direct discharge of stormwater runoff from pavement or roofs to receiving waters? These have an even greater possibility of exceeding the acute standard than a

pond stormwater BMP. Desired outcome: Add a section in 102.21 explicitly exempting stormwater discharges.

Department Response: See response to (i), above.

- (q) Gametogenesis: The criteria for gametogenesis are the criteria that provide the highest reasonable potential for municipal wastewater treatment plants (WWTPs) exceeding the sub-lethal temperature criteria. These are the controlling criteria for WWTP discharges for all Warm Water, Limited Forage Fish, Northern Inland Lakes, Southern Inland Lakes and to lesser degree Great Lakes dischargers. These criteria are the basis for the criteria for the months of January, February, October, November and December. Based on the DNR Technical Support document there were only 12 data points and 7 species from one researcher used to establish the criteria for gametogenesis. Ultimately, the criteria appear to be dependent on an unsubstantiated use of professional judgment. The data used to establish the criteria for gametogenesis were indicated to have come from two sources authored by Haksonson. The referenced dates for the supporting material were 1973 and 1977. The fish species cited included brook trout, Cisco, rainbow trout, white sucker, bluegill, large mouth bass, northern pike, walleye and yellow perch. It should be noted that the EPA Gold Book is dated 1986 and could have considered this data but did not. Also the 1986 Gold Book has no specific recommendations for criteria based on gametogenesis. Until there is a much better data set for gametogenesis, a verifiable scientific procedure to establish the criteria, and specific EPA guidance for criteria related to gametogenesis, the DNR should delete the use of these data from the proposed rules and base the criteria solely on spawning and growth. In addition, the actual calculated criteria should be used rather than the polynomial smoothed data, unless there is a scientifically valid reason for smoothing.

Department Response: WDNR believes that protection against sub-lethal effects is not limited to spawning and growth. The Technical Advisory Committee collectively agreed that the phenomenon of gametogenesis is an important factor in successful reproduction of fish. This fact is supported in the literature by many researchers studying fish reproduction although they have not necessarily determined the temperature preferences for gametogenesis for a wide array of species. While there is a limited array of data available, those data clearly support the need to maintain temperatures within a controlled range to provide optimal conditions for gonad and gamete development. Lastly, waiting for U.S. EPA to generate data first is not a sufficient reason for WDNR to delay doing so when there are representative data available.

- (r) Values of Qs and Qe: The definition of Qe for thermal criteria differs substantially from Qe for other NR 106 substances. Generally, a design flow (e.g. Average Daily Flow) is used for NR 106 calculations. For thermal standards a different Qe is used: “Qe shall be the highest daily maximum effluent rate, expressed as mgd, that has occurred for each calendar month of the year and represents normal operating conditions”. This value would be different for different months of the year and for different years depending on the infiltration/inflow present and other factors. As an example, the design annual average flow for Fond du Lac is 9.84 but in 2008 the maximum daily flow was 57 mgd during the June 12 flooding event. Marshfield’s design average daily flow value is 4.63 mgd but its maximum daily flow can be 30 mgd. Whitewater’s design average daily flow is currently 3.65 mgd but its maximum daily flow can be more than 10 mgd. Brookfield’s design annual average flow is 12.5 mgd but has seen maximum daily effluent flow rates of 50 mgd. Use of this definition requires that monthly Qe and Qs values be used. There is also no or limited correlation between $\frac{1}{4}$ 7Q10 and the highest daily maximum effluent rate thereby resulting in a more stringent limit than would be required to be protective of water quality. It would be more appropriate to use a dry weather Qe when using 7Q10. For consistency with the rest of NR 106, consideration should be given to using the design annual average daily WWTP flow for all NR 106 calculations.

Department Response: Additional changes to the Q_e values used to calculate limitation have been made since this comment was received. The reader is referred to proposed s. NR 106.53(2).

Regardless, the comment pointed out extreme conditions for several POTWs within the state. Some of those conditions are representative of recent flooding conditions and others may account for situations with high levels of infiltration and inflow (I&I). In either case, the proposed rule language indicates that the Q_e values must represent “normal operating conditions.” Censoring data to eliminate data from flooding would be considered by WDNR when determining an appropriate Q_e value.

Lastly, whether high effluent flows were related to either flooding conditions or excessive I&I, the temperatures of the water discharged under either condition would most likely not pose problems with the applicable water quality criteria for the receiving waters. If anything, this comment serves a valuable purpose in encouraging a thoughtful analysis of the reported effluent flows and a well documented description of why such flow are or are not representative of normal operating conditions.

- (s) **Mixing Zones Provisions-Streams**: The mixing zone provision ($\frac{1}{4}$ 7Q10) is consistent with the general language of NR 106 but is more restrictive than the EPA definition which often uses 50 % rather than 25 %. This issue will likely only be an issue for cold water effluent dominated streams especially if the gametogenesis criteria are not deemed applicable but will still be a problem for all classifications if the gametogenesis criteria are applicable. There are many dischargers who have received more than 25 % of the 7Q10 or calculating NR 106 limits based on site-specific mixing zone studies. Consideration should be given to including rule language to allow for more than 25 % if appropriate based on either past or new mixing zone studies. Generally speaking if the calculated value for $Q_s/Q_e > 1 : 1$, the calculated values for limited forage fish (LFF) would not be exceeded by Municipal WWTPs even using the gametogenesis data. For Warm Water this ratio would need to be around 1.25 to 1 even using the gametogenesis data. For cold water the ratio would need to be around 2.5 to 1. The proposed definition of Q_e would likely have the effect of increasing the number of facilities subject to the proposed rule since the value for Q_e would be significantly greater than the current average daily design flow. As a result the value of Q_s/Q_e would decrease over the value of Q_s/Q_e calculated using the average daily design flow.

Department Response: Site-specific mixing zone studies are authorized under the proposed rule. See s. NR 106.53(1)(c). In addition, other avenues of site-specific flexibility are provide within the proposed rule including allowances to develop site-specific ambient temperature in lieu of the values specified in rule, site-specific modeling as an alternative to limitations calculated under the assumed provisions of the rule, and even alternative effluent limitations using the procedures of Subchapter VI where such limitations will result in harm to the indigenous biological community of a receiving water.

- (t) **Mixing Zone Provisions-Inland Lakes**: The technical guidance document presents the proposed equation for calculation of the mixing zone but the allowable size to be used in the equation is not documented beyond the following statement: “The area of the mixing zone is from U.S. Fish and Wildlife models.” No mention is made of the model so that it could be reviewed for applicability to all inland lakes situations. Also this provision for a mixing zone is radically different from the standard 10 times effluent flow or the maximum allowable of 10 % of the lake that has historically been used for calculating water quality based limits. Based on preliminary data for the Fond du Lac WWTP, the mixing zone area would need to be 750,000 square feet to eliminate the reasonable potential for a limit if the current criteria are maintained or 17.2 acres which is significantly less than

10 % of Lake Winnebago and appears overly stringent considering the DNR has stated that they know of no temperature-related adverse impacts from POTW discharges.

Department Response: A draft of the Technical Support Document available on the WDNR website provided the following reference and an explanation of the variables used to establish the proposed lake mixing zones: *Industrial Waste Guide on Thermal Pollution* (Federal Water Pollution Control Administration. September 1968, pg. 102 with specific reference to the published work of Edinger and Geyer 1965, pg. 113). This model was discussed among the Technical Advisory Committee and an alternative was not identified that could be used for statewide application for the different lake types in Wisconsin. Permittees that believe the mixing zone prescribed for inland lakes is too restrictive have several options for seeking relief, including allowances to develop site-specific ambient temperature in lieu of the values specified in rule, development of site-specific water quality criteria, use of water quality modeling to develop site-specific effluent limitations, and even pursuit of alternative effluent limitations using the procedures of Subchapter VI where such limitations will consequence in no harm to the indigenous biological community of a receiving water.

- (u) **Mixing Zone Provisions-Great Lakes:** Although the size of the Great Lakes mixing zone is substantially greater than that for inland lakes, there is again no justification provided in the technical document regarding the US Fish and Wildlife model used.

Department Response: See response to (t), above.

- (v) **Alternative Effluent Limitations:** In reviewing the alternative effluent limitations proposed in the regulations and based on the fact that the limited gametogenesis data triggers most need for limits for WWTPs, the whole process appears to be potentially costly with no certainty in the outcome. There are additional concerns as follows:

1. The rule indicates the application for an alternative effluent limit needs to be made at the time of WPDES permit application. This is difficult at the present time since there is insufficient data to determine the reasonable potential for a limit.
2. The burden of proof appears to be on the permittee not the DNR. It will be difficult to prove that “the identified representative, important species will be protected and that will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and aquatic life in and on the body of the water into which the discharge will be made.” In the case of thermal standards, this seems particularly inappropriate since the DNR has stated that they do not believe POTW discharges have an adverse temperature impact.
3. The burden of proof for requiring a thermal limit should be on the Wisconsin DNR to demonstrate that the proposed or existing discharge will have a detrimental effect on “the propagation of a balanced, indigenous community of shellfish, fish and aquatic life.” The DNR has in-house expertise in this area. Costs associated with this alternative effluent limit determination will fall mostly on small communities located on low flow streams. They often have limited resources or ability to follow such an approach.
4. The alternative limit is only good for one permit cycle and must be reapplied for each permit cycle. This again increases the cost for the permittee since the process needs to be repeated and may not be approved a second time. Until the DNR provides proof that discharges from WWTPs and municipal Storm Water discharges have an adverse impact on aquatic life, they should be specifically exempted from the rules under 102.21 Applicability.

Department Response: With minor exceptions, the provisions of proposed Subchapter VI are simply a move of former Chapter 209 to a subchapter of NR 106. This was done to consolidate the implementation procedures of point source permitting for heat into one administrative rule. The associated language is consistent with Section 316(a) of the federal Clean Water Act and the provisions of Section 283.17, Stats. Accordingly, this rule revision effort is not intended to make substantive changes that are inconsistent with state or federal law.

(w) DNR Rationale to Regulate WWTPs (December 2008): Based on comments provided in January 2009 (page 16) the DNR indicated that the need for limits for WWTPs was *based on legal counsel guidance* but no formal legal opinion was provided in the comments. This led to the comment in the introduction of the DNR Rationale prepared by Duane Schuettpelez and Dan Joyce that “the Department does not now feel that such a categorical exemption from application of water quality standards is defensible” that became the basis for including POTWs. The DNR, based on the evidence presented in the Rationale, concluded that the “thermal component of effluent from POTWs is not likely to impair aquatic life use” and “application of these rules will mean that POTWs will not receive temperature limits except in very rare circumstances where site specific data are available that indicate the thermal component of the POTW effluent is having a significant adverse effect on aquatic life uses in the receiving water.” The rules as proposed, however, based on the DNRs own data in the Rationale, indicate that a significant fraction of POTWs will end up with limits even though they are not having an adverse effect. If a categorical exemption is not provided the burden of proof becomes the permittee who must convince both the DNR and environmental groups that their discharge is not having an adverse effect. The legal counsel opinions that resulted in the removal of the categorical POTW exemption should be provided to the public to allow the affected dischargers to comment on the basis for that legal opinion. Based on a review of the document, there are additional comments related to the material and these are summarized below:

1. A statement is made that typical raw sewage temperatures are in the range of 50 to 60 degrees F. The lower value is typical but the upper value is often 65 to 70 degrees F in the summer.
2. A statement is made that activated sludge systems have effluent sewage temperatures near 70 F in the summer (which is typical) and in the lower 40s F in the winter which is typical only of certain types of activated sludge plants (e.g. oxidation ditches).
3. The analysis of the DNR relative to the potential for wastewater treatment plants to exceed limits indicated that 25 % of the referenced facilities would not meet limits based on their methods of analysis. It is not clear from the summary which temperatures were used for which facilities. However, their method to determine typical values for wastewater effluent by averaging data collected from as far north as Superior and as far south as Milwaukee and Brookfield are not reasonable due to the extreme variability in temperatures particularly in November and December. Use of the average value of 51 F in November is unrealistic for use with southern Wisconsin dischargers.

Using the data from Brookfield which appear to be representative for southern Wisconsin the following communities for which Strand Associates, Inc provides permit consulting experience would likely have thermal limits:

- Fond du Lac (October, November and December, Mixing Zone Restriction)
- Lancaster (LFF-October, November and December)
- Brookfield (Small Warm-November and December)
- Mount Horeb (LFF-November)

- Waupun (Small Warm-November)
- Whitewater (Small Warm-November) based on Whitewater average monthly temperatures.

The evaluation does not include all Strand Associates, Inc. permit consulting experience but was limited to those communities for which information was readily available. Based on Lancaster and Mount Horeb, the statement made in the DNR Rationale (page 2, number 5) relative to a limit on LFF also appears to be unrealistic especially for LFF streams where the ratio of Q_e/Q_s is less than 1.

Also the method used to determine reasonable potential made used the monthly average values for the POTWs. The actual proposed rule requires the use of the highest weekly average temperature for the month and the use of the highest daily maximum effluent flow rate for each individual month not the average daily design flow which was used for the above analysis. Use of both in combination, especially in November, where the temperatures early in the month are typically higher than those at the end of the month and flows can exceed average daily design will result in more POTWs subject to effluent limits.

Department Response: There appear to be several comments embedded within this one comprehensive comment. Modifications have been made to the proposed rule package that address most of those comments. The commenter is referred to the responses to #8, above for a summary of the common issues and WDNR responses. Most notably, WDNR has revised the language of s. NR 106.59 to ensure that dissipative heat will be considered the norm when determining whether or not WPDES permits for POTWs will include sub-lethal effluent limitations. POTWs with effluent temperatures that exceed applicable acute water quality criteria will need to manage heat accordingly. POTWs that do not exceed applicable sub-lethal water quality criteria will not have sub-lethal effluent limitations imposed. Lastly, POTWs that do exceed applicable sub-lethal criteria will have sub-lethal limitations included in a permit if there are strong reasons to believe the heat in the effluent is not dissipating a short distance from the outfall structure and that heated effluent is posing a significant or demonstrated effect on the receiving water biological community.

One other substantive change involved the effluent flow used to establish effluent limitations. Specifically, the effluent flow used to calculate sub-lethal effluent limitations has been modified in s. NR 106.53(2) to recognize an alternative to the daily maximum flow. The proposal now indicates that the effluent flow will equal the 7-day rolling average of all flows in a calendar month.

In response to the request for DNR's legal opinion, legal counsel's rationale is the same as EPA's legal counsel's opinion as reflected in their comments.

2. *Feedback Received:* **Foth Infrastructure & Environment, LLC** (Sheryl Pham)

- (a) The weekly average temperature is too conservative and should be based on: 1) the average daily flow and/or 2) the average of the daily average effluent temperature.

Department Response: The weekly average effluent temperature, while somewhat conservative, was selected to best represent the exposure period that relates most closely to sub-lethal impacts. WDNR believes a 7-day average of the daily maximum temperatures is appropriate in determining reasonable potential to exceed a weekly average limitation. Opting for an average of the daily average would not provide the same level of protection.

- (b) WDNR should clarify whether the weekly average effluent temperature takes into account the days in which there is no effluent discharge or only days in which temperature is recorded.

Department Response: The term “weekly average effluent temperature” is defined in proposed s. NR 106.52(10) and includes all days in a calendar week whether or not there is a discharge of heated effluent.

3. *Feedback Received:* **Madison Gas & Electric (MG&E)** (Mike Ricciardi – MG&E and Greg Seegert – EA Engineering)

- (a) The size of the mixing zone for inland lakes is far too small;
- (b) The proposed rule properly allows for dilution in flowing waters but inappropriately and unfairly does not allow dilution (i.e, mixing) in lakes; and
- (c) The proposed rule ignores the well-established avoidance behavior of fishes.

Department Response: As noted in the detailed response to comments, the method selected for determining the size of mixing zones for lakes is from Edinger and Geyer (1965). This approach has been a part of WDNR’s General Permit strategy for many years and has not posed significant compliance problems for those dischargers covered by such permits. This may be a reflection of the small size of the discharge from a permittee issued a General Permit than a facility the size of MG&E.

During the active phase of the Thermal Standards Advisory Committee (1994-1998 & 2001-2005), there was limited discussion on alternative approaches to determining mixing zone size for lake discharges. That is probably a reflection of the small number of inland lakes discharges that occur in Wisconsin and the fact that none were directly represented on the Advisory Committee. In reviewing the comments made on behalf of MG&E, WDNR agrees that “dilution” is not a key factor in the equation contained in the draft rule. Instead, the equation accounts mainly for heat dissipation – primarily to the atmosphere.

In a proactive manner, MG&E suggested an alternative approach whereby the mixing zone would be determined as a percentage (i.e., 10%) of the area of the lake. MG&E suggested that such an approach would be consistent with existing mixing zone provisions in s. NR 102.05(3)(e). However, this approach has not been fully evaluated to determine if it is a viable approach for regulating heat. Further, this suggestion has not been compared with any other approaches that may be more appropriate. Without initiating a full literature search to determine other viable options, WDNR has opted to encourage the use of the flexibility built into the rule to explore alternatives to the status quo in the development of appropriate limitations. In this case, MG&E (through its consultant) was encouraged to explore water quality modeling approaches authorized under proposed s. NR 106.58 to seek site-specific mixing considerations.

To accommodate additional concerns expressed by MG&E’s consultant, s. NR 106.58 was modified to clarify that effluent limitations calculated as a result of approved site-specific modeling would not be subject to the mixing zone area restrictions in s. NR 106.55(7).

Lastly, when developing the water quality criteria in proposed s. NR 102.25, WDNR acknowledged that the methodology for determining tolerance thresholds for fish in a laboratory setting could not account for avoidance behavior. Furthermore, WDNR does not have the resources to conduct modeling on a site-by-site basis to determine either the extent of the actual effluent plume nor the behavior of local fish species to that plume. Instead, WDNR calculated conservative values for protection with the understanding that dischargers that may be affected by effluent limitations based

upon those thresholds could request flexibility for other aspects of the rule. In particular, some dischargers may find relief by providing site-specific ambient temperature in lieu of the values specified in rule. Alternatively, site-specific modeling could be considered as an alternative to “default” mixing zones as described above. Lastly, a discharger may seek an alternative effluent limitation using the procedures of Subchapter VI if they believe there will be no harm to the indigenous biological community.

4. **Feedback Received: Madison Metropolitan Sewerage District (MMSD)** (Dave Taylor)

- (a) The changes made to the rule related to POTWs are significantly different than the approach contained in the rule proposal taken to public hearing in January 2008. Such a substantive change warrants a dialogue to effectively review the impact to the municipal discharge community.

Department Response: Staff met with representatives of the municipal community several times since the January 2009 meeting and have modified the rule language to ensure that effluent limitations for temperature are included in POTW permits only when there is a high potential that dissipation of incidental heat in the receiving water will not occur rapidly.

- (b) WDNR noted in its own documents that POTW effluent dischargers of heat are not causing or are not known to cause impairments to water quality. The commenter indicated that there is agreement amongst MEG members.

Department Response: WDNR staff agreed and modified the rule language with this premise as the basis for the resulting rule. As noted above, effluent limitations for temperature will be included in those POTW permits when there is a high potential that dissipation of incidental heat in the receiving water will not occur rapidly or when adverse impacts to the fish and aquatic life community are reasonably possible.

5. **Feedback Received: Midwest Environmental Advocates (MEA) and River Alliance of Wisconsin (RAW)** (Karen Shapiro & Denny Caneff)

- (a) The proposed sub-lethal criteria fail to adequately protect fish spawning.
(b) The proposed acute criteria fail to adequately protect fish survival

Department Response: Development of the proposed water quality criteria (both acute and sub-lethal) took place over several years with direct oversight of the entire Technical Advisory Committee. Both the methods and the resulting values were discussed openly and consensus was reached on the methodology as well as the data used to develop the proposed criteria. With the exception of a few minor adjustments to the proposed sub-lethal criteria as directed by U.S. EPA in late 2007, WDNR has not modified the methods, data used or resulting criteria since the last formal meetings of the Technical Advisory Committee.

MEA/RAW proposed an alternative method of statistically analyzing the available data to increase protection against sub-lethal impacts. One of the reasons for proposing the alternative approach was an assumption that the data used by WDNR in establishing the criteria were the absolute maximum temperatures that could be tolerated without adversely impacting spawning. On the contrary, WDNR compiled data from several sources including Becker (1983)³, Wismer & Christie (1987)⁴, as well as observations of WDNR Fisheries Biologists. In nearly all cases, the spawning data used were

³ Becker, George C. *Fishes of Wisconsin* 1983. 1052pp.

⁴ Wismer, Donald A. and Alan E. Christie. *Temperature Relationships of Great Lakes Fishes*. 1987. 195 pp.

anecdotal data that were not derived as a result of controlled laboratory studies designed to estimate a *thermal dose*. Collectively, these data are very useful in projecting criteria that will protect against impacts to spawning, but they are not to be construed as absolute values. Furthermore, ambient temperature alone is not the only factor associated with the incidence of spawning. Other factors affecting spawning including age, successful gonad and gamete development, and suitable habitat. In consideration of the observational nature of the data used and the site-specific conditions affecting spawning, WDNR believes the proposed sub-lethal criteria are reasonable and has not made any additional changes to the sub-lethal criteria in the draft rule package taken to public hearings in January 2008.

MEA/RAW also proposed an alternative method of statistically analyzing the available data to increase protection against acute impacts. In support of the alternative approach, MEA/RAW identified 12 fish species in which the potential criteria in Table 6 of the proposed rule are above the maximum thermal tolerance data cited in WDNR supporting documents. It should be noted that Table 6 would only be used to determine water quality criteria for a permittee that requested site-specific ambient temperature values to be used to derive effluent limitations. Without such a request, the applicable criteria would be those specified in Tables 2-5 – whereby the applicable acute criteria would be protective all twelve of the species identified by MEA/RAW.

Thus, Table 6 values would only be used when a request for an alternative ambient temperature value was made by a permittee. In doing so, the request must include a comprehensive data set regarding the ambient temperature for a particular site. WDNR must review those data and approve, disapprove, or approve with modifications the values requested by the permittee. In doing so, WDNR may consider available data about the local fish assemblage and determine if the resultant water quality criteria meet the intent of proposed s. NR 102.04(4)(e) which prevents heated water from causing lethality to animal, plant or other aquatic life. If deemed necessary, WDNR could disapprove a permittee request made under s. NR 102.26. Alternatively, WDNR could disapprove the request as stated and approve alternative values to ensure the prevention of lethality. As such, WDNR believes the proposed acute criteria are reasonable and has not made any additional changes to the criteria in the draft rule package taken to public hearings in January 2008.

- (c) The proposed procedures for establishing water quality-based effluent limitations in WPDES permits do not adequately protect against harm within the mixing zone.

Department Response: After reviewing file information and soliciting input from WDNR Water Quality Biologists throughout the state, WDNR has only been able to document two fish kills in the past 30 years that were clearly attributable to the discharge of hot water. In both cases, neither permit was operating with temperature limits in a WPDES permit. This is noted as justification for the approach being proposed now. Under the current proposal, heat will be regulated where there is a reasonable potential for the effluent temperature to exceed the thresholds necessary to protect fish from both acute and sub-lethal effects. In addition, WDNR included language in proposed s. NR 102.04(4)(e) that clearly states that heated effluent shall not cause lethality to animal, plant or other aquatic life. With this clause and the inclusion of legally defensible temperature limitations in WPDES permits, WDNR believes this comment is effectively addressed and that adequate protection is indeed an outcome of the proposed rules.

- (d) The proposed eligibility criteria for General Permits for non-contact cooling water discharges are different (not as many restrictions) than proposed in January 2008.

Department Response: The rule package taken to Public Hearing in January 2008 included provisions for “cap limits” along with a number of eligibility criteria as mentioned by the commenter. A couple

of those criteria were restrictions on the volume of wastewater that could be discharged and the ratio of the discharge volume in comparison of the flow of a unidirectional receiving water. As a result of removing the cap limits, an alternative screening approach referred to as “flow ratios” was included in the proposed rules. WDNR believes this approach negates the need for either the volume maximum or the previously specified ratio.

WDNR did re-evaluate two other criteria that had been removed and reinstated them in the proposed rule revision. Those two criteria relate to waste streams with additives and discharges that may lead to public hazards due to unsafe ice conditions. In the case of the former, discharges with water quality additives (including biocides) will not be eligible to receive the general permit unless that additive is approved for use by WDNR.

6. Feedback Received: **Midwest Food Processors Association (MWFPA)** (Nick George)

- (a) The timing of the request for feedback does not allow for the development of real economic liability numbers.

Department Response: Comment noted. The short timeframe allowed for feedback is reflective of WDNR’s need to bring the proposed rule package to the Natural Resources Board as soon as reasonably possible to avoid possible over-promulgation of thermal standards by U.S. EPA.

- (b) One company that is a member of MWFPA noted that the surface waters receiving waste from their facilities are classified as “warm water communities” by *default* and an alternative classification that requires less stringent effluent limitations may be more appropriate. This will have a huge economic impact on the company.

Department Response: WDNR has been unable to revise Chapter NR 104 since 1984 due to resource limitations as well as opposition by members of the public to the perception of “downgrades” to use designations. As such, the “default” classification of *warm water community* is applied to many receiving waters that may be classified as *limited forage fish* or *limited aquatic life*. For these situations, temperature limitations must be of the warm water use designation. Until such time that a classification change is approved – if at all – the affected permittees may have to rely on the procedures available to seek a variance under Section 283.15, Stats., or utilize the flexibilities built into the proposed rule package as it relates to site-specific ambient temperature, site-specific water quality criteria, alternative background temperature and/or flow, results of water quality modeling, or even a request for an alternative effluent limitation under proposed Sub-chapter VI.

- (c) One company indicated that having to meet sub-lethal temperature limitations from a non-contact cooling water waste stream will have a “significant negative” impact. Although costs were not projected, the company stated that a heat exchanger/cooling tower will not be economically feasible.

Department Response: The development of thermal water quality standards and associated point source implementation procedures was not initiated as an effort to have a negative impact on the discharge community. However, analysis of the available data has resulted in the proposal for defensible temperature criteria to protect the fish and aquatic life community of surface waters throughout the state. Those criteria require the imposition of effluent limitations for some dischargers of heated effluent. If the costs of managing heat to meet those effluent limitations are as high as suggested by the commenter, affected permittees may have to rely on the procedures available to seek a variance under Section 283.15, Stats., or utilize the flexibilities built into the proposed rule package as it relates to site-specific ambient temperature, site-specific water quality criteria, alternative

background temperature and/or flow, results of water quality modeling, or even a request for an alternative effluent limitation under proposed Sub-chapter VI.

- (d) The same comment from Foth Infrastructure & Environment, LLC was included in the MWFPFA feedback.

Department Response: See the response to #2, above.

7. *Feedback Received:* **Milwaukee Metropolitan Sewerage District** (Susan Anthony)

The comment was seeking confirmation of an error made by WDNR in preparation of a supporting document for the proposed rule package. The error was directly related to the Milwaukee Metropolitan Sewerage District operations.

Department Response: In an attempt to explain how the latest approach to addressing POTWs under the Thermal Standards rule package, WDNR prepared a document entitled, “Rational for Establishment of Effluent Limitations for POTWs.” In that document, WDNR summarized effluent temperature data from several municipal POTWs around the state, including the Milwaukee Metropolitan Sewerage District. After the document was shared publicly, it was learned that the data for the Milwaukee Metropolitan Sewerage District was not wastewater from the POTW, but cooling water from another operation within the system. WDNR has amended the document and has withdrawn any data or conclusions related to that waste stream.

8. *Feedback Received:* **Municipal Environmental Group (MEG)** (Paul Kent)

- (a) The changes made to the rule related to POTWs are significantly different than the approach contained in the rule proposal taken to public hearing in January 2008. Such a substantive change warrants a dialogue to effectively review the impact to the municipal discharge community.

Department Response: Staff met with representatives of the municipal community several times since the January 2009 meeting and have modified the rule language to ensure that effluent limitations for temperature are included in POTW permits only when there is a high potential that dissipation of incidental heat in the receiving water will not occur rapidly.

- (b) WDNR noted in its own documents that POTW effluent dischargers of heat are not causing or are not known to cause impairments to water quality. The commenter indicated that there is agreement amongst MEG members.

Department Response: WDNR staff agreed and modified the rule language with this premise as the basis for the resulting rule. As noted above, effluent limitations for temperature will be included in those POTW permits when there is a high potential that dissipation of incidental heat in the receiving water will not occur rapidly or when adverse impacts to the fish and aquatic life community are reasonably possible.

- (c) POTW effluent may exceed sub-lethal criteria in early fall to winter versus the warmest summer months when stream flow is very low.

Department Response: WDNR recognizes the fact that POTWs generally do not introduce heat to the waste stream and that effluent temperatures closely track groundwater temperatures in the coldest winter months. While these effluent temperatures may exceed the proposed sub-lethal criteria at the end of the discharge pipe, WDNR assumes that dissipation of any incidental heat occurs quickly in

the mixing zone and that applicable criteria are met in a very short distance from the outfall. Rule language has been modified to reflect this and articulate WDNR's intent to impose effluent limitations in those situations where representative data indicate a likely impact to the receiving water biological community.

- (d) POTW effluent is most likely to result in potential exceedance issues in effluent dominated streams, lakes with small mixing zones, and cold water streams.

Department Response: The comment is accurate in that water quality criteria may be exceeded where effluent dominates the receiving water flow. In recognition of this, WDNR revised the rule to allow the temperature of the effluent to represent the ambient temperature in the selection of applicable limits. This new provision only applies to discharges located at the most upstream portion of effluent dominated receiving waters.

There are very few POTW discharges to lakes in Wisconsin. However, for those that do, the same considerations of dissipative cooling apply and it is expected that heat will be assimilated by the surrounding water a short distance from the outfall structure such that standards are not exceeded. As such, effluent limitations will only be included when representative data indicate a likely impact to the lake biological community as result of the POTW discharge.

Similar to lakes, there is a relatively small number of POTW discharges to cold water communities. In some cases, the effluent temperature may exceed the acute or sub-lethal water quality criteria for the receiving water. When it is determined that there is reasonable potential for an exceedance of an acute water quality criterion, a limitation will be included in a WPDES permit and the discharger will be provided with a reasonable compliance schedule. Prior to permit issuance, a permittee may seek the myriad of flexibilities built into the rule package that may result in an alternative limitation than that calculated under s. NR 106.55. In cases where an alternative limitation is not authorized, permittees may seek a variance to a water quality standard in accordance with the provisions of s. 283.15, Stats., if warranted.

- (e) WDNR information provided to the public suggests that 25% of POTWs may exceed criteria in the proposed rules. MEG believes this percentage would be higher.

Department Response: WDNR compiled available data on stream flow and design flow for 514 existing POTWs that discharge to flowing waters. Using the flow ratio table in proposed s. 106.55(6)(a), it was determined that approximately 141 POTWs would not need to be considered for thermal effluent limitations because they exceed an effluent flow to stream flow ($Q_s:Q_e$) ratio of $\geq 20:1$. Of the remaining 373 POTWs, 115 facilities have a $Q_s:Q_e$ ratio of $\geq 20:1$ and would only be considered for acute limitations. It is highly unlikely that any of those facilities would discharge effluent that exceeded the applicable acute criteria and would not have effluent limitations imposed in a WPDES permit. The remaining 258 would be evaluated to determine the reasonable potential to exceed both acute and sub-lethal limitations. Regardless, for existing discharges, WDNR would only impose those limitations when it is determined with data that there is a high potential that dissipation of incidental heat in the receiving water will not occur rapidly or when adverse impacts to the fish and aquatic life community are reasonably possible.

With respect to "new" or "re-located" POTWs, WDNR believes that those facilities should be designed to meet applicable water quality standards – including those for heat. Accordingly, the proposed rule contains requirements for dischargers to use representative data to determine the reasonable potential to exceed effluent limitations for temperature. That being said, the flow ratio categories in proposed s. NR 106.55(6)(e) would be applied and may eliminate the need for acute

limitations, sub-lethal limitations, or even both types of limitations when large dilution ratios are available.

9. Feedback Received: **Saputo Cheese** (Mark Tollakson)

The rushed schedule for implementing the revisions to the thermal rule regulations does not allow enough time to adequately assess the impact to our facilities both from an operational viewpoint and a capitol cost perspective. Therefore, we are asking for a delay in implementation of the rule changes to allow us the time to do the proper studies.

Department Response: The short timeframe allowed for feedback is reflective of WDNR's need to bring the proposed rule package to the Natural Resources Board as soon as reasonably possible to avoid possible over-promulgation of thermal standards by U.S. EPA. Department Administration has determined that further delays are not possible and will defer to instructions from the Natural Resources Board regarding timing.

That being said, dischargers that believe they may be adversely impacted by the proposed rules should consider the myriad of flexibilities built into the proposed rule package as it relates to site-specific ambient temperature, site-specific water quality criteria, alternative background temperature and/or flow, results of water quality modeling, or even a request for an alternative effluent limitation under proposed Sub-chapter VI. As a last resort, dischargers may consider the opportunities to seek a variance under Section 283.15, Stats. However, such a variance, if granted, is only in effect for three years at which time WDNR must re-evaluate its applicability.

10. Feedback Received: **Wisconsin Paper Council** (Ed Wilusz)

- (a) The commenter recognized that flexibility was incorporated into the proposed rule and that many dischargers may need to utilize some of the options for obtaining relief from effluent limitations during certain times of the year. Several questions were submitted to gain a better understanding of how these provisions of the proposed rule could be implemented – especially in the area of data needed to make successful demonstrations for additional dilution.

Department Response: WDNR provided the commenter with mixing zone guidance that has been used for many years in the evaluation of requests for additional mixing. That guidance provides many of the answers to the questions submitted. Regardless, each mixing zone study is a case-by-case evaluation of the conditions associated with the operation and design of an outfall structure in relation to the available mixing in the receiving water. While many of the questions raised are answered in the mixing zone guidance document, some will remain unanswered until site-specific data are reviewed by jointly by WDNR and the affected permittee.

- (b) The commenter raised questions by letter and follow-up phone conversations about the provisions of the proposed rule language that determines which effluent flow to use in the calculation of effluent limitations. Specifically, the main concern was related to the proposed use of the highest daily maximum effluent flow in the derivation of weekly average limitations to meet the sub-lethal criteria.

Department Response: WDNR staff reviewed the comments and agreed that the averaging period of sub-lethal effluent limitations (weekly average) warranted a different approach than proposed in January 2008. As a result, changes were made to s. NR 106.53(2) to clearly state that under most cases, acute effluent limitations will be calculated using the highest daily maximum effluent temperatures while the sub-lethal limitations will be calculated using the 7-day rolling average effluent flow.

- (c) The proposed rule does not clearly identify the annual average flow value as the value to be used to determine the $Q_s:Q_e$ ratio in s. NR 106.55(6)(a).

Department Response: WDNR clarified this by including rule language in s. NR 106.53 that specifies the flow to be used. For purposes of determine the flow ratio, WDNR proposed to use annual average flow month for facilities not subject to ch. NR 210 and annual average design flow for those subject to ch. NR 210. The language include is consistent with existing language related to Q_e in Subchapter II of ch. NR 106.

11. *Feedback Received:* **WE Energies** (Kathleen Standen)

The commenter noted that WDNR had inadvertently identified an energy reliability standard in proposed s. NR 106.51 with the wrong name. WDNR referred to the standard as “National” when it is actually “North American.”

Department Response: The change was made as noted.

**RATIONALE FOR ESTABLISHMENT OF
TEMPERATURE EFFLUENT LIMITATIONS FOR POTWS
NR 106.59, Wis. Adm. Code (proposed)
Wisconsin Department of Natural Resources
March 27, 2009**

INTRODUCTION

Current state rule (NR 102.05(4), Wis. Adm. Code) exempts publicly owned treatment works (POTWs) from the thermal requirements of state water quality standards and, therefore, effluent temperature limitations have not been established in WPDES permits for such facilities. While the Department does not now feel that such a categorical exemption from application of water quality standards is defensible, the data available lead the Department to conclude that in all but very unusual cases, the thermal component of effluent from POTWs is not likely to impair the aquatic life uses of Wisconsin surface waters. Consistent with this, the Department is proposing to establish rules which consider dissipative cooling in deciding whether or not to impose temperature limits on POTWs. Application of these rules will mean that POTWs will not receive temperature limits except in very rare circumstances where site-specific data are available that indicate the thermal component of the POTW effluent is having a significant adverse effect on aquatic life uses in the receiving water.

CHARACTERIZATION OF POTW TEMPERATURES

Domestic wastewater (hereinafter “sewage”) temperature normally falls within a fairly well-defined range of values and is not as highly variable as may be experienced with industrial processes. Raw sewage temperatures are primarily controlled by soil temperatures because sewage collections systems are buried underground. In rare exceptional circumstances, sewage temperatures may be affected by an industrial source of high temperature wastewater. Otherwise, typical raw sewage temperatures are in the range of 50°F to 60°F.

There is a moderated seasonality associated with raw sewage temperatures, depending on the depth of sewers and soil temperatures. In addition, POTW effluent temperatures may be significantly affected by the type of treatment facility and reflect greater seasonal fluctuations than the influent. The major factor governing effluent sewage temperatures are ambient air temperature and residence time within the POTW.

The Department obtained effluent temperature information from several POTWs around the state, representing different sizes and types of systems as summarized in Table 1.

Effluent temperature data is very limited because it is not a parameter for which measurement is required by permit. Furthermore, most POTW facilities do not routinely measure effluent temperature, even though they may measure raw sewage temperature for process control purposes. Activated sludge systems typically have effluent sewage temperatures near 70°F in the summer months and in the lower 40’s°F in the winter months. Effluent temperature from lagoon systems more closely correspond to ambient water temperatures ranging from the low to mid-30’s°F in the winter to the 80’s°F in summer.

With the very limited data available, the Department calculated composite effluent temperatures by calculating the arithmetic mean of the lowest and highest monthly average temperatures for the facilities listed in Table 1. For example, the resulting composite temperature for February was estimated at 43 °F having used the values from Hammond (33°F) and Madison Metropolitan Sewerage District (53°F). This information is presented to show the general trend of POTW effluent temperatures being relatively cool throughout the year in contrast to those of industrial discharges that add heat to wastewater as a part of the various manufacturing processes.

Table 1
Monthly Effluent Temperatures (°F), 2005

	J	F	M	A	M	J	J	A	S	O	N	D
Hudson	51	50	52	56	59	65	69	70	69	67	61	56
Madison Met	53	53	54	58	61	67	69	70	70	66	62	57
Elmwood							74	73	70	64	56	50
Brookfield	52	51	51	54	58	63	65	67	66	63	58	54
Weyerhauser					54					50	41	
Hammond		33	33	45	54	68	73	72	67	56	41	39
Superior			41	38		62				63	47	
Composite	52	43	43.5	48	57.5	65	69.5	70	68	58.5	51.5	48

EXAMPLE TEMPERATURE LIMITATIONS

The Department used data from the several wastewater systems listed in Table 1 to calculate effluent temperature limitations for a group of example facilities representing varying effluent and stream flow rates and aquatic life categories. The limitations were determined based on the rule procedures contained in the final rule order as of April 2009. The composite values from Table 1 are compared to the calculated effluent temperature limitations to determine if there is reasonable potential to exceed such limitations. The results are presented in Table 2.

From this analysis of example facilities, the Department concludes the following:

1. Reasonable potential to exceed calculated limits were only associated with the sub-lethal criteria, not acute criteria.
2. Exceedances of calculated effluent limits will typically occur in the fall to early winter (cool-season) months. A primary reason for this is that higher effluent temperatures lag behind falling ambient stream temperatures at this time of the year.
3. A primary driver in determining whether calculated effluent temperature limits cannot be attained for discharges to flowing waters is the ratio of stream flow to effluent flow ($Q_s:Q_e$). In general, receiving streams with flow dominated by effluent would be unable to meet calculated effluent temperature limits without supplemental cooling.
4. Discharges to cold water streams will more likely have a reasonable potential to exceed calculated effluent limitations.
5. Discharges to limited aquatic life and limited forage fish streams can usually meet limits regardless of the $Q_s:Q_e$ ratios because the applicable water quality criteria are less stringent.

Of the 22 example facilities subject to this analysis, five had at least one month during which the calculated effluent limits would be exceeded. Four of those six facilities would have more than one month where calculated effluent limits would be exceeded.

Table 2

Summary of Facilities Evaluated for Compliance with Effluent Temperature Limits

Facility	Discharge Category	Calculated Limits Achieved At All Times?	Month Exceeded	ΔT Above Calculated Effluent Limitation
Algoma	Large	Yes	-	
Amani	Very Large	Yes	-	
Beaver Dam	Large	No	Nov	1°F
Black Creek	Large	Yes	-	
Blue Mounds	Very Large	Yes	-	
Boscobel	Very Small	Yes	-	
Bowler	Very Small	Yes	-	
Brokaw	Very Small	Yes	-	
Brookfield	Large	No	Oct	2°F
			Nov	8°F
			Dec	4°F
			Jan	2°F
Brooklyn	Small	Yes	-	
Caroline	Very Small	Yes	-	
Cedar Grove	Very Large	Yes	-	
Cross Plains	Small	No	Aug	1°F
			Sep	2°F
Cumberland	Very Large	Yes	-	
Delafield	Large	No	Nov	1°F
Elmwood	Very Small	Yes	-	
Hammond	LIMITS NOT CALCULATED			
Hudson	Very Small	Yes	-	
Lake Mills	Large	Yes	-	
Lancaster	Very Large	Yes	-	
Madison Metropolitan Sewerage District.	Large	No	Oct	5°F
			Nov	12°F
			Dec	8°F
			Jan	4°F
			Feb	1°F
Racine	Lake discharge	Yes	-	
Superior	Lake discharge	Yes	-	
Weyerhaeuser	INSUFFICIENT DATA			

Notes:

“VL” means “very large”, $Q_e/Q_s = 0$

“L” means “large”, $Q_e/Q_s > 1$

“S” means “small”, $0.1 < Q_e/Q_s < 1$

“VS” means “very small”, $Q_e/Q_s < 0.1$

“ΔT” represents the difference between the monthly average effluent temperature in Table 1 and the calculated weekly average temperature limitation, based on the draft thermal rule (as of January 2009).

THERMAL IMPACT ZONES

As indicated, some POTWs would be unable to comply with temperature limits necessary to attain cool-season (fall/winter) sub-lethal temperature criteria where the ratio of receiving stream flow to effluent flow does not provide sufficient dilution. As a result, a zone will exist within the receiving stream downstream of the outfall where the sub-lethal temperature criterion is not met. Because the sub-lethal criteria are intended to protect gametogenesis in fish that require exposure to cool water to produce

gametes, allowing thermal impact zones where temperatures exceed these criteria may possibly have some adverse effect on the reproductive success of fish that inhabit these impact zones.

Since these impacts occur during the cooler periods of the year and since the relative difference in temperature between the POTW effluent and the criterion is small, WDNR anticipates that allowing these thermal impact zones will have no more effect on the receiving streams than the mixing zones or default dilution assumptions that are already a part of Wisconsin's permit limit calculation procedures. In nearly all cases where a receiving stream has some flow, sub-lethal (i.e., chronic) limits for toxic substances in WPDES permits are calculated based on an assumed dilution with the receiving stream of $\frac{1}{4}$ of the average minimum 7-day flow which occurs once in 10 years (7-Q₁₀). Allowing dilution in this manner for attaining sub-lethal limits is widely accepted across the country and is generally thought to have negligible impacts on aquatic organisms in the nation's surface waters. Allowed thermal impact zones are similar to areas of allowed dilution because, although there may not be sufficient upstream flow to attain the sub-lethal toxic substance criteria through dilution alone, there is sufficient difference between the effluent temperature and the air temperature and ambient water temperatures to meet sub-lethal criteria within a short distance from the discharge due to dissipation of heat from the POTW effluent to the cooler stream bed, receiving water, and air. The proposed rules include provisions to ensure that the area affected will be small, impacts on aquatic life minimized, and lethal conditions are prevented.

ALLOWED CHRONIC THERMAL IMPACT ZONES

As stated previously, allowed thermal impact zones are limited or relatively small, restricted areas in surface waters where sub-lethal temperature criteria may not be attained as the POTW effluent cools to ambient temperatures. From the perspective of aquatic organisms in a receiving water, allowed thermal impact zones function in exactly the same way as assumed dilution used in the calculation of WPDES permit limits for toxic substances based on chronic water quality criteria specified in ch. NR 105. In both cases, there will be a gradient of water quality from a high concentration or temperature at the point of discharge to a lower concentration or temperature at some location downstream or away from the discharge point that complies with the criterion. The theory behind both is that small areas of elevated concentrations or temperatures within a water body may be tolerated without having an unacceptable impact on the biological community of the water body as a whole. The primary difference is that with allowed sub-lethal thermal impact zones, the gradient occurs as a result of loss of heat from the effluent to the surrounding environment, rather than primarily from dilution.

Federal regulations at 40 CFR 131.13 allow states to include procedures in their water quality standards that describe how the water quality standards will be implemented. Mixing policies are identified in the Federal regulations at 40 CFR 131.13 as an example of this kind of implementation procedure. USEPA has approved state mixing procedures that allow for default dilution in the calculation of permit limits where the default dilution can be reasonably expected to not have an unacceptable impact on the biological community of a receiving water as a whole. USEPA Great Lakes Water Quality Guidance at 40 CFR 132 incorporates the concept of default dilution for limits based on chronic toxic substance criteria into the implementation procedures contained in the Guidance. The State of Wisconsin has incorporated these requirements into ch. NR 106, Wis. Adm. Code.

WDNR recognizes that POTWs still must comply with acute temperature criteria to ensure that lethality does not occur in State waters. However, allowed chronic thermal impact zones are appropriate for sub-lethal temperature criteria if implemented in a way that ensures that the sub-lethal criteria are attained within a limited or short distance from the POTW discharge location and for the waterbody as a whole. Consistent with this model, the proposed s. NR 106.59 allows for similar consideration of default assumed cooling in the calculation of limits for temperature to comply with sub-lethal temperature criteria. Since it is widely accepted practice that limited areas may be permitted within a surface water where chronic criteria are not attained provided there is sufficient area within the waterbody as a whole where chronic criteria are attained, WDNR believes that allowing for default assumed cooling to meet

sub-lethal criteria is consistent with the Federal Clean Water Act and regulations and state law. However, where representative data are available that suggest that the mixing and dissipation is not as assumed, sub-lethal limitations must be included in WPDES permits to rectify potential non-attainment of the applicable fish and aquatic life uses of the receiving water.

ADDITIONAL CONSIDERATIONS

To meet limits that would apply under the calculation procedures in the proposed rule, some POTWs would have to employ a cooling system for the effluent. Although cooling towers may be effective during some months, some type of mechanical cooling would be needed whenever air temperatures are higher than effluent temperatures. This can occur at any time of the year. The use of cooling towers for POTW effluent temperature reduction would also necessitate enhanced treatment and the addition of biocides or other additives to assure effective operation.

If cooling were required, WDNR believes the most practical means of cooling at smaller facilities is the use of a packaged chilled water plant utilizing an air-cooled condenser. For larger plants, the most practical means of cooling the effluent is the use of a packaged chilled water plant utilizing a water-cooled condenser and a cooling tower in conjunction with a glycol loop.

Based on this information, the following are additional considerations used in formulating the final rule:

1. There are several direct and indirect costs associated with requiring cooling systems at POTWs. There are direct capital and operating costs for the cooling equipment over and above the costs for treatment to remove other pollutants.
2. The energy needed to operate the cooling equipment will result in an increased drain on our overall electrical generating and transmission capacity. Such increases result in increased emissions of air pollutants and carbon dioxide from power plants.
3. USEPA or another state routinely evaluated POTW effluent temperatures when establishing water quality based effluent limitations.
4. POTW effluent, as stated, exhibits a very moderated temperature regime reflective of seasonal ambient surface water temperatures. The difference between ambient and effluent temperatures is usually small and not significant during most parts of the year. POTW effluent temperatures are primarily controlled by soil or ground temperatures. Raw sewage has temperature similar to groundwater that may exfiltrate into streams. Although temperatures may change within the treatment facility, the effluent temperatures are not largely different from that of ambient surface waters.
5. Related to the foregoing, § 283.17, Wis. Stats., (and § 316(a) of the Federal Clean Water Act) contains provisions that allow for the establishment of “alternative” effluent limitations for temperature provided that such limitations “...assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is made.” USEPA has adopted regulations to implement the provisions of § 316(a) at 40 CFR 125. The Department’s corresponding rule at NR 209 Wis. Adm. Code, as modified and included in the proposed rule at NR 106, Subchapter VI, Wis. Adm. Code, contains provisions similar to the federal regulation.

PROPOSED RULE FOR JANUARY 2008 PUBLIC HEARINGS

In the rule proposal subject to comment in January 2008, WDNR contemplated establishing a variance to attaining thermal water quality standards for existing POTWs based on findings that installation of cooling systems at such facilities is prohibitively expensive and would cause substantial and widespread

social and economic impacts. The proposed rule did, however, require the Department to include effluent temperature limitations in POTW permits if the following conditions were present:

- Representative effluent temperatures are greater than 120°F; or
- The Department determined that the effluent temperature has demonstrated impacts on aquatic populations at the site.

Additionally, this “variance” for POTWs would not apply to new POTW sources because new sources are better able to select sites and discharge locations for new wastewater treatment facilities where thermal effluent limitations determined according to the rule can be attained at all times.

PROPOSED RULE FOR ADOPTION IN 2009

In response to the proposed rule, the Department received comments from parties that were both in support of and opposed to the January 2008 proposal (Refer to Attachment A). Most significantly, USEPA commented that the data and analyses provided by the Department did not satisfy the requirements of the Federal 40 CFR 131.10(g), thus USEPA could not support a variance from water quality standards specific to municipal discharges. Those who generally expressed support suggested that the rule should grant an outright exemption rather than create a variance process and that the variance should extend to new facilities as well as existing facilities. The commenter generally opposed to the variance indicated that the basis for establishing this variance to POTWs was not substantiated and, therefore, should not be granted, as proposed.

The comments received from USEPA urged the Department to consider the possibility of incorporating consideration of default assumed cooling through allowed chronic thermal impact zones instead of a statewide variance from water quality standards for POTWs facing cool season temperature limits. USEPA explained that what was being sought through the variance proposal was functionally an allowed zone for cooling and that is procedurally and functionally identical to the assumed dilution approach already incorporated into Wisconsin’s procedures for calculating limits and already accepted by USEPA and Wisconsin stakeholders.

The Department believes that the allowed chronic thermal impact zone provision included in the proposed rule at NR 106.59 provides a technically, scientifically, and legally defensible mechanism for evaluating effluents for cool season temperature limits. Based on much of the information contained in this document, the Department has reason to believe that POTW effluent discharges of heat are generally not causing and are not known to cause an impairment to water quality including the protection and propagation of a balanced population of shellfish, fish and wildlife in and on surface waters. The final rule proposal provides safeguards to ensure that any allowed chronic thermal impact zones will be small, will prevent lethal conditions, and will not impair the overall biological community of any water body as whole. The final rule proposal also authorizes the Department to exercise discretion, through the WPDES permitting process, to establish limitations where there is or could be harm to a fish and aquatic life community.

December 2009 On-Line Version by:
Duane H. Schuettepelz
Daniel J. Joyce

March 2009 Edits by:
Bob Masnado

ATTACHMENT A

COMMENTS RECEIVED IN RESPONSE TO PROPOSED RULE

In response to the proposed rule, the Department received comments from 5 parties with respect to the provisions of NR 106.59, Wis. Adm. Code. Midwest Environmental Advocates disagreed with the proposal to grant a variance to POTWs for the following reasons:

- The variance was not sufficiently justified and no categorical variance should be granted;
- Granting the variance will not assure that standards are attained;
- The variance should not extend for more than 3 years;
- Effluent temperature monitoring is not required in all cases;
- Effluent temperature limitations should reflect current effluent temperature in all cases to assure they do not increase; and
- The variance should not be extended to new facilities.

Conversely, four commenters affiliated with POTWs supported the variance and/or suggested revisions to the proposed rule. The comments included the following:

- POTWs should be exempt from temperature limitations, rather than requiring an application and granting variances;
- New POTWs should be allowed to apply for and be granted variances in the same manner as existing facilities because the costs are equivalent regardless if a new or existing facility, and there could be an effect on use of effluent reuse options;
- The environmental impacts of operating cooling technology at POTWs is greater than the thermal impact of POTW effluent;
- The rule should “guarantee” the granting of a variance to a POTW that applies for the variance.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAR 6 2009

REPLY TO THE ATTENTION OF:

WQ-16J

Todd L. Ambs, Administrator
Division of Water
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, Wisconsin 53707-7921

Dear Mr. Ambs:

I am writing to express U.S. Environmental Protection Agency's support for Wisconsin's efforts to achieve compliance with the Clean Water Act (CWA) by adopting and implementing revised water quality standards for temperature. As you may know, temperature is defined as a pollutant under the CWA. In order to meet the CWA section 101 goal of restoring the chemical, physical, and biological integrity of the Nation's waters and provide for the "protection and propagation of fish, shellfish, and wildlife" per section 101(a)(2) of the CWA, states are required to adopt and implement thermal criteria that are protective of aquatic life and other designated uses in all waters of the state. Wisconsin Department of Natural Resources has developed criteria that are based on resident aquatic fish species, relevant acute and chronic biological endpoints, and ambient temperatures specific to each class of waters in the state, and has worked to develop implementation rules for these thermal criteria. These steps will enhance prospects for the implementation of thermal criteria that are water quality-based and protective of aquatic life in Wisconsin's waters.

I would like to point out that as a result of the 1979 Wisconsin Supreme Court ruling which in effect blocked state implementation of the water quality standard for temperature that was approved by EPA in 1975; Wisconsin is the only Region 5 state that has not implemented temperature criteria uniformly across the state. All other Region 5 states adopted statewide temperature criteria in the late 1980s: Ohio in 1985, Michigan and Minnesota in 1987, Indiana in 1988, and Illinois in 1989. Implementation procedures differ somewhat between states; however, all Region 5 states have had temperature criteria in their water quality standards for at least twenty years, with the exception of Wisconsin. This has adversely affected Wisconsin's permitting process for power plants and led to EPA's objections to permit issuances for two power plants in the early 1990s that remain unresolved.

I understand that significant comments have been received as Wisconsin has presented the proposed thermal criteria to the regulated community and citizens of your state. Adopting thermal criteria that comply with the CWA and protect the waters of the state of Wisconsin is of paramount importance. EPA is your regulatory partner in these efforts and ensuring that thermal criteria are available to implement in National Pollutant Discharge Elimination System (NPDES)

permits is a joint priority. This will allow EPA and Wisconsin to resolve the outstanding NPDES objections and any future thermal concerns with regulated discharges.

Please be aware that these comments do not constitute a final Agency action under sections 303(c)(2) and 402 of the CWA. They are provided to indicate EPA's strong support for WDNR moving forward with thermal rules. Please feel free to contact me or have your staff contact Linda Holst at (312) 886-6758 or Pete Jackson at (312) 886-3894 if we can help as your agency pursues adoption of the revised temperature rules.

Sincerely,

A handwritten signature in black ink, appearing to read "Yinka G. Hyde", with a long horizontal flourish extending to the right.

Yinka G. Hyde
Director, Water Division

Fiscal Estimate — 2007 Session

<input checked="" type="checkbox"/> Original <input type="checkbox"/> Updated <input type="checkbox"/> Corrected <input type="checkbox"/> Supplemental	LRB Number Bill Number	Amendment Number if Applicable Administrative Rule Number NR 102 & NR 106
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Subject

Revisions of Chs. NR 102 & NR 106, Wis. Adm. Code related to water quality standards for heat.

Fiscal Effect

State: No State Fiscal Effect
 Indeterminate

Check columns below only if bill makes a direct appropriation or affects a sum sufficient appropriation.

- | | |
|--|---|
| <input type="checkbox"/> Increase Existing Appropriation | <input type="checkbox"/> Increase Existing Revenues |
| <input type="checkbox"/> Decrease Existing Appropriation | <input type="checkbox"/> Decrease Existing Revenues |
| <input type="checkbox"/> Create New Appropriation | |

Increase Costs — May be possible to absorb within agency's budget.

Yes No

Decrease Costs

Local: No Local Government Costs

Indeterminate

1. Increase Costs
 Permissive Mandatory
2. Decrease Costs
 Permissive Mandatory

3. Increase Revenues
 Permissive Mandatory
4. Decrease Revenues
 Permissive Mandatory

5. Types of Local Governmental Units Affected:

- Towns Villages Cities
 Counties Others _____
 School Districts WTCS Districts

Fund Sources Affected

- GPR FED PRO PRS SEG SEG-S

Affected Chapter 20 Appropriations

Assumptions Used in Arriving at Fiscal Estimate

SUMMARY OF RULE - In 1975, several steam-electric power companies sued the department on the grounds that the temperature standards set forth in ch. NR 102, Wis. Adm. Code, were more stringent than federal requirements. The case was heard before the Wisconsin Supreme Court which ruled that the provisions of ch. NR 102 were equivalent to categorical-based effluent limitations for the steam-electric power discharge category and overturned the thermal requirements of ch. NR 102. The effect of the ruling was to severely limit the department's ability to regulate the amount of heat discharged from power plants which extended to other sources of heat as well. The end result is that the department has been unable to effectively and consistently regulate the discharge of heated water in WPDES permits. Instead, the department has had to rely on voluntary heat management which has been the exception versus the norm.

FISCAL IMPACT-DNR: A minor increase in work load may be realized in the conduct of training sessions to staff and the determination of need for limits in WPDES permits, especially through the first round of reissued permits (i.e., the first five years of the rule being in effect). This minor increase in permit drafting work load includes learning a new process and calculating more limitations than in the past. This increase in work load will be slight and short-term.

Fiscal Impact-Other than DNR: Nearly all discharges include some change in water temperature during use and prior to discharge. The extent of the change in temperature is highly variable and very facility-specific. While there may be some instances when a State or local government facility would need to address heated discharges, it is impossible to estimate the extent and cost of treatment options. The department believes most facilities will not need to make significant changes in operation.

Long-Range Fiscal Implications

None Expected

Prepared By:	Telephone No.	Agency
Joe Polasek	266-2794	Department of Natural Resources
Authorized Signature	Telephone No.	Date (mm/dd/ccyy)
	266-2794	

Fiscal Estimate — 2007 Session

Page 2 Assumptions Narrative Continued

LRB Number	Amendment Number if Applicable
Bill Number	Administrative Rule Number NR 102 & NR 106

Assumptions Used in Arriving at Fiscal Estimate – Continued

Space not needed.

Fiscal Estimate Worksheet — 2007 Session
 Detailed Estimate of Annual Fiscal Effect

Original Updated
 Corrected Supplemental

LRB Number	Amendment Number if Applicable
Bill Number	Administrative Rule Number NR 102 & NR 106

Subject

Revisions of Chs. NR 102 & NR 106, Wis. Adm. Code related to water quality standards for heat.

One-time Costs or Revenue Impacts for State and/or Local Government (do not include in annualized fiscal effect):

Annualized Costs:		Annualized Fiscal Impact on State Funds from:	
		Increased Costs	Decreased Costs
A. State Costs by Category			
State Operations — Salaries and Fringes		\$	\$ -
(FTE Position Changes)		(0.00 FTE)	(- 0 FTE)
State Operations — Other Costs			-
Local Assistance			-
Aids to Individuals or Organizations			-
Total State Costs by Category		\$ 0	\$ - 0
B. State Costs by Source of Funds			
GPR		\$	\$ -
FED			-
PRO/PRS			-
SEG/SEG-S			-
State Revenues	Complete this only when proposal will increase or decrease state revenues (e.g., tax increase, decrease in license fee, etc.)	Increased Revenue	Decreased Revenue
GPR Taxes		\$	\$ -
GPR Earned			-
FED			-
PRO/PRS			-
SEG/SEG-S			-
Total State Revenues		\$ 0	\$ - 0

Net Annualized Fiscal Impact

	<u>State</u>	<u>Local</u>
Net Change in Costs	\$ 0	\$ 0
Net Change in Revenues	\$ 0	\$ 0

Prepared By:	Telephone No.	Agency
Joe Polasek	266-2794	Department of Natural Resources
Authorized Signature	Telephone No.	Date (mm/dd/ccyy)
	266-2794	

**ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD
REPEALING, RENUMBERING, RENUMBER AND AMENDING, AMENDING AND CREATING RULES**

The State of Wisconsin Natural Resources Board adopts an order to **repeal** NR 102.03(8) to (10), 102.04(4)(b), 102.04(4)(e)1., 102.04(5) to (7), 102.05(4), 102.07 to 102.09 and Ch. NR 209; to **renumber** NR 102.03(1) to (7) and 102.04(4)(e) 2. and 3.; to **renumber and amend** NR 102.04(4)(e); to **amend** NR 102.01(1) to (3), 102.04(title), 102.04(1)(intro.), 102.04(2), 102.04(3)(intro.), 102.04(4)(title), 102.04(4)(a), 102.05(3)(intro.), 102.05(3)(b), (c), (e) and (f) and ch. NR 106 (title); to **create** NR 102 subch. I (title), 102.03(intro.), 102.04(e), 102.04(5) to (9), ch. NR 102 subch. II and ch. NR 106 subchs. V and VI relating to thermal water quality standards and effluent limits.

WT-36-07

Summary Prepared by the Department of Natural Resources

Statutory Authority and Explanation: Sections 227.11(2), 281.15, 283.13, and 283.17, Stats., grant authority to the Department to promulgate rules pertaining to water quality standards and associated water quality-based effluent limitation calculation procedures for inclusion in Wisconsin Pollutant Discharge Elimination System (WPDES) permits, including specific procedures to modify such limitations.

Statutes Interpreted and Explanation: Sections 281.15 and 283.13, Stats., authorizes the Department to establish appropriate thermal water quality standards and associated water quality-based effluent limitation calculation procedures for heated discharges to surface waters of the state. Section 283.17, Stats., provides the Department the authority to establish thermal effluent limitation modification procedures.

Related Statute or Rule: The Department is currently operating in a tenuous manner under existing requirements of ch. NR 102, Wis. Adm. Code, that took effect on October 1, 1973. The situation is tenuous because the Wisconsin Supreme Court declared significant portions of ch. NR 102 invalid (Wisconsin Electric Power Company v. Wisconsin Natural Resources Board, 90 Wis. 2d 656 (1979)), yet the U.S. Environmental Protection Agency (U.S. EPA) requires thermal limits to be included in appropriate WPDES permits to meet federal law and regulations.

Plain Language Rule Analysis: In 1974, U.S. EPA approved Wisconsin's water quality standards (including thermal standards) as required in Public Law 92-500, the "Federal Water Pollution Control Act Amendments of 1972" (later the Clean Water Act). Those standards became effective in 1975 following the normal rule-making process. Subsequently, the Department was sued by several steam-electric power companies on the grounds that the application in permits of the temperature standards set forth in ch. NR 102, Wis. Adm. Code, were more stringent than federal requirements. Section 283.11(2), Stats., prohibits the Department from establishing requirements more stringent than federal regulations unless the requirements are needed to meet water quality standards. The Wisconsin Supreme Court ruled that significant provisions of ch. NR 102 were equivalent to technology-based effluent limitations for the steam-electric power discharge category and overturned the thermal requirements of ch. NR 102. These requirements remain in the Administrative Code as they were originally adopted in 1973.

The effect of the Wisconsin Supreme Court ruling was to severely limit the Department's ability to regulate the amount of heat discharged from power plants and other sources. The decision has made regulation of all heated discharges to waters of the State confusing and difficult to implement consistently. It is important to note, however, that other provisions in federal and state law allowed facilities to demonstrate that heated discharges, particularly those from power plants, were not adversely affecting aquatic life, thereby removing the necessity to limit the amount of heat from such discharges.

In 1991, U.S. EPA, through their oversight of the WPDES program, requested that the Department implement the thermal standards contained in ch. NR 102 to regulate the discharge of heat from two specific power plants. Following the Wisconsin Supreme Court decision noted above, the Department concluded it did not have the authority to regulate heat in these WPDES permits. Citing 40 CFR 124.57, U.S. EPA proposed to issue the permits under the requirements of the federal National Pollution Discharge Elimination System (NPDES) program. U.S. EPA has chosen not to issue these two permits and the permits remain in effect as they were when they expired in the early 1990s.

In response to U.S. EPA's proposal, the Department requested an opportunity to revise ch. NR 102 to adopt scientifically defensible thermal water quality standards and companion provisions in ch. NR 106 to develop procedures for establishing effluent limitations to meet the thermal water quality standards. An advisory committee was formed in late 1994 to undertake this task. The committee members consisted of several Department staff along with representatives of U.S. EPA-Region 5, academia, municipal government, environmental advocacy groups, and industrial dischargers, including representatives from steam-electric producers, pulp and paper manufacturers, and food producers. The result of this committee's work was to produce a draft rule that received Natural Resource Board approval for public hearing in August 1998. From the time following public hearings on those draft rules until May 2001 progress on finalizing the thermal rules revisions was inhibited by staffing changes associated with reorganization, retirement, and reassignment, as well as the need to address significant internal and external concerns related to the draft rule raised during the comment period.

A Thermal Standards Revisions Advisory Committee was reestablished in the summer of 2001 and included representatives from all of the original stakeholder entities, as well as one representative each from the aquaculture industry and Trout Unlimited. This advisory committee met 15 times between October 2001 and July 2004 and, along with additional Department staff, made significant contributions in the development of these rules. Following additional internal delays and time for Department staff to address remaining problems with the draft rules, the advisory committee met one last time in June 2007 and draft rules were subsequently prepared. This draft included numerous significant changes from the draft rule package presented to the Natural Resources Board in August 1998. Many of the changes were made in response to comments the Department received during and following the public hearings in 1998. In January 2008, the Department held additional public hearings to receive comments on the draft rules prepared following the June 2007 Advisory Committee meeting. In January 2009, the Department held a public informational meeting to receive feedback on changes made in response to comments made by U.S. EPA-Region 5. Changes were made in response to this feedback by stakeholders, including U.S. EPA-Region 5.

Adoption of water quality standards and criteria for temperature and the procedures for establishing effluent temperature limitations in WPDES permits will begin a new era of protecting fish and aquatic life from discharges of heat into waters of the state. These rules will allow the Department to adequately account for the different biological needs of fish and aquatic life over the course of the varying seasons in a year and across different water body classifications, primarily through the application of both acute and sub-lethal monthly criteria.

One effect of the proposed rule that is expected to influence many dischargers of heat is the increase in monitoring frequency for effluent temperature and flow. The purpose of the increased monitoring frequency is to capture data that defines the representative monthly effluent temperatures and effluent flows for a given facility. To date, monitoring at most facilities has not been sufficient to determine representative effluent temperature. This rule order incorporates monthly standards, whereas past regulation of heated discharges, to the extent it occurred, was implemented annually or seasonally. Some dischargers are currently monitoring at or more frequently than the minimum requirements being proposed and thus will not be affected. However, others have had very limited effluent temperature monitoring

requirements to this point. For those permittees with insufficient data, the increased monitoring frequency will last for a minimum of one year of the initial permit cycle, after which additional monitoring may not be required.

The impact of the proposed rule on regulated facilities is varied – ranging from more stringent temperature limits to no limit at all. Additionally, some sources that have had thermal limits may not require one under the proposed rule and some sources will be required to have thermal limits even though they have not had one in the past.

Throughout the rule development process, effort was made to consider the many different types of discharges that could be affected and to avoid permitting thermal discharges that are not adversely impacting aquatic environments. All attempts have been made to assure the proposed rules are environmentally protective, but not unreasonable. Evidence of this are the many options available to dischargers and permittees built into NR 102 and NR 106 that give them opportunities to deviate from the default rule parameters if they feel it prudent to do so and it is justified with data. These options include use of site-specific ambient temperature data, development of site-specific water quality criteria development, allowance for water quality modeling. Other allowances are made for collection of representative data when those data are unavailable, provisions for real-time monitoring and compliance, options to consider variability in discharge, options to address cold shock and rate of temperature change conditions, special effluent limitation procedures for domestic sewage treatment facilities and provision for determining alternative effluent temperature limitations in Subchapter VI.

Actual reporting requirements are expected to remain relatively unchanged with permittees reporting the necessary information via the Discharge Monitoring Report system or via the annual reporting requirements of a general permit, except that monitoring and compliance records will be reported for each month, rather than seasonally or annually. Some permittees will also be required to submit monitoring data with permit applications. Fees associated with ch. NR 101 (Wis. Adm. Code) do not currently apply to discharges of heat.

This rule order revises chs. NR 102 and NR 106, summarized as follows:

Chapter NR 102 - Water Quality Standards for Wisconsin Surface Waters. The existing thermal standards are found in sections NR 102.04, NR 102.05, and NR 102.07 to NR 102.09. This rule order amends several subsections of sections NR 102.04 and NR 102.05, repeals sections NR 102.07 to NR 102.09, and creates a new Subchapter II entitled “Water Quality Standards for Temperature.” Subchapter II contains the water quality criteria and ambient temperatures for specific fish and aquatic life use communities, as well as other site-specific temperature-related standards.

Chapter NR 106 - Procedures for Calculating Water Quality Based Effluent Limitations for Toxic and Organoleptic Substances Discharged to Surface Waters. This rule order also amends the title of this rule to “Procedures for Calculating Water Quality Based Effluent Limitations for Point Source Discharges to Surface Waters.” There are no procedures to calculate effluent temperature limitations in the existing NR 106. This rule order will create two new subchapters: Subchapter V entitled “Effluent Limitations for Temperature”, and Subchapter VI entitled “Alternative Effluent Limitations for Temperature.” Subchapter V specifies data requirements, methods for calculating and determining the necessity for water quality-based effluent limitations, application of and compliance with the limitations in WPDES permits, variance procedures, and other related limitation and permitting issues. The proposed rule takes into account the ambient temperature and flow of a receiving water in the calculation of effluent limitations. The effluent limitation calculation incorporates a mass balance approach, making it equivalent to other codified limitation calculation procedures. The mass balance approach enables a determination of the amount of heat that a receiving water can assimilate without

adversely affecting fish and aquatic life. Supplemental limits, including those of 120°F to prevent incidental injury (scalding) to humans, 86°F to protect other limited aquatic life waterbodies, and those to be considered on a site-specific or case-by-case basis, are also included. Subchapter VI specifies procedures for determining alternative effluent limitations for temperature to those established for point source discharges calculated under Subchapter V who demonstrate that such limitations are more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is made. Subchapter VI includes application, compliance schedule, and public notice procedures, and replaces Chapter NR 209, which is repealed by this rule order.

This rule order, which establishes sub-lethal criteria and the application of criteria on a monthly basis presents the possibility that Department staff may have an increase in WPDES permitting workload. However, with the use of appropriate information technology and training, this increase in workload should be relatively minor. Additionally, the rule has been crafted in such a way as to reduce workload where possible through the use of a General Permit. It is anticipated this revised General Permit will make permitting activities more efficient and more consistent without a significant increase in workload.

It is important in this discussion to remember the reason for this rule order. Ever since the Wisconsin Supreme Court ruling made significant portions of the existing thermal rules invalid, the state has not had the clear and consistent authority to regulate the discharge of heat for the protection of fish and aquatic life in waters of the state. In fact, in a March 6, 2009 letter from Ms. Tinka Hyde (Region 5 Water Division Director) to Todd Ambs (WDNR Water Division Administrator), the U.S. EPA has stated that “adopting thermal criteria that comply with the Clean Water Act and protect the waters of the state of Wisconsin is of paramount importance.” U.S. EPA noted in that letter that Wisconsin is the only Region 5 state that has not implemented temperature criteria uniformly across the state.

Many of the potential effects of this rule order are simply due to the fact that there has been limited regulation of thermal discharges for 30-plus years. Those who may be affected by these rules have discharged heat to the possible detriment of the quality of state waters and the aquatic life in such waters. However, without these rules, U.S. EPA has the authority to directly regulate discharges of heat under the NPDES permit program, and has indicated intent to do so. This rule order will allow the Department to regulate the discharge of heat in a manner appropriate to Wisconsin’s needs and prevent a level of federal involvement that is unwarranted.

Federal Regulatory Analysis: Federal requirements regarding water quality standards and permitting are found in various sections of the Clean Water Act (33 U.S.C. 1251 et seq.), as well as 40 CFR Parts 122, 123, 125, 130, and 131. Additionally, U.S. EPA’s current water quality criterion recommendations for temperature are those contained in “Quality Criteria for Water, 1986”, which is commonly referred to as the Gold Book. States can adopt the standards in the U.S. EPA guidance, or can develop and adopt alternative standards.

Most state thermal standards, including those in states adjacent to Wisconsin and discussed in the next section, predate the 1986 Gold Book. Thus, most state thermal standards consist of requirements that differ from the current federal guidance. Although U.S. EPA could compel states to adopt thermal standards consistent with the federal guidance by disapproving the existing state standards and forcing promulgation of the federal guidance, they have not done so to date.

Comparison with Rules in Adjacent States: Illinois, Iowa, Michigan, and Minnesota each require the application of state-specific thermal standards. Although each of the states includes thermal standards language unique to the state, all of the states share, in common, at least 3 of the following 4 primary thermal standards components:

- Natural daily and seasonal temperature fluctuations shall be maintained.
- A general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3.6 to 5.4°F in streams or rivers (2°F for cold water).
- A general maximum temperature rise at the edge of a mixing zone or temperature above existing natural ambient or listed maximum limit of 3°F in inland lakes.
- Specific monthly maximum temperatures not to be exceeded.

Wisconsin's existing thermal water quality standards include all of the four components listed above. However, each of them was declared invalid under the aforementioned Wisconsin Supreme Court decision. State courts in the adjacent states have not made similar rulings and the standards are used to establish limitations or other requirements in permits. In fact, all but a handful of states in the country currently incorporate some form of the above listed components in their state thermal standards. So, it is the State Supreme Court decision that dictates the development of water quality standards that are significantly different in nature than those of adjacent states.

The likely result of promulgating and implementing the thermal water quality standards in this proposed rule order in comparison with adjacent states is dependent on each specific situation and varies widely from a less restrictive standard to a more restrictive effluent limitation. The situational factors that play a significant role include water body type and classification, month, resident fish species and their spawning cycles, flow and ambient temperature of the water body, and various discharge facility process parameters. One thing is clear is that the thermal standards and implementation rules will be unique, establish certainty and consistency in their application as water quality-based effluent temperature limitations and conform to the decision of the Wisconsin Supreme Court ruling.

Summary of the factual data and analytical methodologies: The proposed thermal water quality criteria and ambient temperatures have been developed using an extensive amount of data. The data came from 721 articles, reports, theses, dissertations, books, personal communications, and other types of publications, the vast majority of which were peer reviewed. The source of the data is from laboratory studies, field research and observation, and modeling, and the majority is based on the effects of temperature on fish species. Except for the limited aquatic life (LAL) category, fresh water fish data was used exclusively to develop criteria because there was insufficient data from other aquatic organisms to develop criteria. Additionally, the criteria developed from fish data was used to conclude that it would also be protective of the aquatic community as a whole (i.e., that fish were reasonable surrogates for all aquatic organisms). Since LAL waters do not contain fish, data from other organisms was used to develop the criterion for LAL waters not classified as wastewater effluent channels or wetlands.

All criteria are developed based on a combination of factors to make them as relevant and specific to Wisconsin waters as possible. The factors used to develop the criteria include:

- Type of water body use or designation;
- Data restricted to only fish species known to exist in Wisconsin;
- Fish species data correspond to specific water body use or designation;
- Criteria are related to ambient water temperatures in Wisconsin water bodies;
- Ambient temperatures are specific to each water body use or designation; and
- Life history activities (gametogenesis, spawning, growth) are considered for the months they are known to occur in Wisconsin.

The development of the proposed thermal water quality criteria and ambient temperatures incorporate a variety of simple to more complex statistical methodologies. The simple analyses included calculating averages and geometric means. The development of acute criteria included regression analyses, analyses of covariance, and additional procedures that are consistent with analyses the Department has used for

developing criteria for toxic substances in ch. NR 105. Five factor polynomial regression analyses were used to develop the final sub-lethal criteria for each water body classification.

The proposed effluent limitation calculation procedures incorporate a mass balance equation, making it essentially equivalent to other limit calculation methods currently in rule. The mass balance approach enables the determination of the amount of heat a receiving water can assimilate without adversely affecting fish and aquatic life taking into account the ambient temperature and flow of the waterbody.

Analysis and supporting documents used to determine effect on small business or in preparation of economic impact report: None. A formal analysis was not done to determine the effect on small business because the rule will not directly impact small businesses, as defined in s. 227.114(1), Stats. Preparation of an economic impact report has not been requested.

Effects on small business: There is no known effect on small businesses due to the proposed rule. The regulated facilities are not small businesses.

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SECTION 1. NR 102 subch. I (title) is created to read:

Subchapter I - General

SECTION 2. NR 102.01 (1), (2) and (3) are amended to read:

NR 102.01(1) The purpose of this chapter is to establish, in conjunction with chs. NR 103 to 105, water quality standards for surface waters of the state pursuant to s. ~~281.15(2)(b)~~ 281.15, Stats. This chapter describes the designated use categories for such waters and the water quality criteria necessary to support these uses. This chapter and chs. NR 103 to 105 constitute the water quality standards for the surface waters of Wisconsin.

(2) The long-range goal of Wisconsin water quality standards is to protect the use of water resources for all lawful purposes. Water quality standards shall protect the public interest, which includes the protection of public health and welfare and the present and prospective uses of all waters of the state for public and private water supplies, propagation of fish and other aquatic life and wild and domestic animals, domestic and recreational purposes, and agricultural, commercial, industrial, and other legitimate uses. In all cases where the potential uses are in conflict, water quality standards shall protect the general public interest.

(3) Water quality standards serve as a basis for developing and implementing control strategies to achieve legislative policies and goals. Water quality standards are the basis for deriving water quality based effluent limitations and the limitations shall be determined to attain and maintain uses and criteria, unless more stringent effluent limitations are established to protect downstream waters. Water quality standards also serve as a basis for decisions in other regulatory, permitting or funding activities that impact water quality.

SECTION 3. NR 102.03 (intro.) is created to read:

NR 102.03 (intro.) In this chapter, the following definitions are applicable to terms used:

SECTION 4. NR 102.03(8) to (10) are repealed.

SECTION 5. NR 102.03(1) to (7) are renumbered NR 102.03(2) to (8).

SECTION 6. NR 102.03(1) is created to read:

NR 102.03(1) “Ambient temperature” means the typical existing temperature of a surface water outside the direct influence of any point source discharge, which may include daily and seasonal changes.

SECTION 7. NR 102.04 (title) is amended to read:

NR 102.04 Categories of ~~standards~~ surface water uses and criteria.

SECTION 8. NR 102.04(1) (intro.) is amended to read:

NR 102.04(1) GENERAL. (intro.) To preserve and enhance the quality of waters, ~~standards~~ surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone ~~and the effluent channel~~ meet the following conditions at all times and under all flow and water level conditions:

SECTION 9. NR 102.04(2) is amended to read:

NR 102.04(2) REVISED STANDARDS USES AND CRITERIA. ~~It should be recognized that these standards will~~ The following uses and criteria may be revised as new information or advancing technology indicate that revisions are in the public interest. Water used for hydropower and commercial shipping depends mainly on quantity, depth and elevation; consequently, no specific quality ~~standards~~ criteria for these uses have been prepared.

SECTION 10. NR 102.04(3) (intro.) is amended to read:

NR 102.04(3) FISH AND OTHER AQUATIC LIFE USES. ~~The department shall classify all~~ All surface waters ~~into~~ shall belong in one of the fish and other aquatic life subcategories described in this subsection. Only those use subcategories identified in pars. (a) to (c) shall be considered suitable for the protection and propagation of a balanced fish and other aquatic life community as provided in the federal water pollution control act amendments of 1972, P.L. 92-500; 33 USC 1251 et seq.

SECTION 11. NR 102.04(4) (title) is amended to read:

NR 102.04(4) STANDARDS CRITERIA FOR FISH AND AQUATIC LIFE.

SECTION 12. NR 102.04(4)(a) is amended to read:

NR 102.04(4)(a) *Dissolved oxygen.* Except as provided in ~~(eb)~~ and s. NR 104.02(3), the dissolved oxygen content in surface waters may not be lowered to less than 5 mg/L at any time.

SECTION 13. NR 102.04(4)(b) is repealed.

SECTION 14. NR 102.04(4)(e)(title) and (intro.) are renumbered to NR 102.04(4)(b)(title) and (intro.) and amended to read:

NR 102.04(4)(b) ~~Temperature and dissolved~~ Dissolved oxygen for cold waters. ~~Streams Water bodies~~ classified as trout waters by the department of natural resources (Wisconsin Trout Streams, publication 6-3600 (80)) or as great lakes or cold water communities may not be altered from natural background ~~temperature and~~ dissolved oxygen levels to such an extent that trout populations are adversely affected. Additionally, all of the following conditions shall be met:

SECTION 15. NR 102.04(4)(e)1. is repealed.

SECTION 16. NR 102.04(4)(e)2. and 3. are renumbered to NR 102.04(4)(b)1. and 2.

SECTION 17. NR 102.04(4)(e) is created to read:

NR 102.04(4)(e) *Temperature.* Water quality criteria for temperature shall be determined and applied pursuant to subch. II. Heated effluent shall not cause lethality to animal, plant or other aquatic life.

SECTION 18. NR 102.04(5) to (7) are repealed.

SECTION 19. NR 102.04(5) to (9) are created to read:

NR 102.04(5) RECREATIONAL USE. (a) *General.* All surface waters shall be suitable for supporting recreational use and shall meet the criteria specified in sub. (6). A sanitary survey or evaluation,

or both to assure protection from fecal contamination is the chief criterion for determining the suitability of a water for recreational use.

(b) *Exceptions.* Whenever the department determines, in accordance with the procedures specified in s. NR 210.06(3), that wastewater disinfection is not required to protect recreational uses, the criteria specified in par. (a) and in chs. NR 103 and 104 do not apply.

(6) CRITERIA FOR RECREATIONAL USE. As bacteriological guidelines, the membrane filter fecal coliform count may not exceed 200 colonies per 100 ml as a geometric mean and may not exceed 400 colonies per 100 ml in more than 10% of all samples during any month. Samples shall be required at least 5 times per month.

(7) PUBLIC HEALTH AND WELFARE USE. (a) *General.* All surface waters shall be suitable for supporting public health and welfare.

(b) *Exceptions.* Whenever the department determines a discharge of heated effluent is not exposed or situated in a manner that may pose a realistic potential for scalding of humans, the criterion specified in sub. (8)(c) does not apply.

(8) CRITERIA FOR PUBLIC HEALTH AND WELFARE USE. (a) *General.* The criteria developed pursuant to ss. NR 105.08 and 105.09 shall be met regardless of whether the surface water is used for public drinking water supply or the applicable fish and aquatic life subcategory.

(b) *Taste and odor criteria.* All surface waters providing public drinking water supplies or classified as cold water or warm water sport fish communities as described in sub. (3) shall meet the taste and odor criteria specified or developed pursuant to s. NR 102.14.

(c) *Temperature criteria.* To protect humans from being scalded, the water temperature of a discharge may not exceed 120°F unless specifically authorized under provisions in subchs. V or VI.

(9) WILDLIFE USE AND CRITERIA. (a) *Use.* All surface waters shall be suitable for supporting wildlife.

(b) *Criteria.* The criteria specified in or developed pursuant to s. NR 105.07 shall be met.

SECTION 20. NR 102.05(3) (intro.) is amended to read:

NR 102.05(3) (intro.) MIXING ZONES. Water quality standards shall be met at every point outside of a mixing zone. The size of the mixing zone ~~cannot be uniformly prescribed, but~~ shall be based on such factors as effluent quality and quantity, available dilution, temperature, current, type of outfall, channel configuration and restrictions to fish movement. For toxic and organoleptic substances with water quality criteria or secondary values specified in or developed pursuant to chs. NR 102 and 105, allowable dilution shall be determined as specified in ch. NR 106 in addition to the requirements specified in this subsection. As a guide to the delineation of a mixing zone, the following shall be taken into consideration:

SECTION 21. NR 102.05(3)(b), (c), (e), and (f) are amended to read:

NR 102.05(3)(b) Providing passageways ~~in rivers~~ for fish and other mobile aquatic organisms.

(c) Where possible, mixing zones being no larger than 25% of the cross-sectional area or volume of flow of ~~the stream~~ a flowing water body and not extending more than 50% of the width.

(e) Mixing zones not exceeding 10% of a an inland lake's total surface area.

(f) Mixing zones not ~~interfering with~~ adversely impacting spawning or nursery areas, migratory routes, nor mouths of tributary streams.

SECTION 22. NR 102.05(4) is repealed.

SECTION 23. NR 102.07 to 102.09 are repealed.

SECTION 24. NR 102 subch. II is created to read:

Subchapter II - Water Quality Standards For Temperature

NR 102.20 Purpose. The purpose of this subchapter is to establish water quality standards for temperature pursuant to s. 281.15(1), Stats. Water quality standards for temperature shall protect fish and other aquatic life from mortality, immobilization, loss of equilibrium, impaired growth, adverse reproductive effects, and other sub-lethal effects.

NR 102.22 Definitions. In this subchapter, the following definitions are applicable to terms used:

(1) “Acute effects” means any effect resulting in death or immobilization. For temperature, the acute criteria of this subchapter are based on Upper Incipient Lethal Temperature (UILT) values that are not representative of immediate lethality.

(2) “cfs” means cubic feet per second, usually pertaining to stream or effluent flow.

(3) “Cold shock” means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavioral or physiological performance and may lead to death.

(4) “Daily maximum temperature” means the highest allowed water temperature for a calendar day, outside a mixing zone allowed in this subchapter.

(5) “Great Lakes” means the open Wisconsin waters of Lake Superior, Lake Michigan, Green Bay and Chequamegon Bay, as well as adjoining open waters that exhibit characteristics of Lake Superior, Lake Michigan, Green Bay or Chequamegon Bay, or in other ways are determined by the department to be equivalent to these waters.

(6) “Maximum weekly average temperature” means the highest allowed arithmetic mean of all daily maximum temperatures during a calendar week, outside mixing zone allowed in this subchapter.

(7) “mgd” means million gallons per day.

(8) “Sub-lethal effects” means effects resulting in inadequate gonad development, gamete production and viability, spawning or growth.

NR 102.23 Categories of standards applicable to temperature. The department shall establish water quality standards for temperature to protect the following:

(1) Public health and welfare uses, as established in s. NR 102.04(7) and (8).

(2) Fish and other aquatic life uses as established in s. NR 102.04(3). For exclusive purpose of the application of water quality standards for temperature, the warm water sport fish and warm water forage fish communities, as defined in s. NR 102.04 (3)(b) and (c), are treated together as warm water communities.

(3) Great Lakes communities as defined in s. NR 102.22(6). This use exists only for the regulation of discharges of heat.

NR 102.24 General water quality criteria for temperature. (1) There may be no temperature changes that may adversely affect aquatic life.

(2) Natural daily and seasonal temperature fluctuations shall be maintained.

NR 102.245 Temperature Criteria for Limited Aquatic Life Communities. (1) For the purposes of temperature criteria, all surface waters classified as diffused surface waters, wetlands and wastewater effluent channels, as defined in s. NR 104.02(1), shall be characterized as limited aquatic life communities.

(2) The department may, as appropriate, characterize other surface waters not identified in sub. (1) as limited aquatic life communities.

(3) The temperature in waters classified as limited aquatic life shall be restricted as follows:

(a) Temperatures at any point in waters classified as wastewater effluent channels may not exceed 120°F.

(b) Temperatures at any point in waters classified as wetlands shall not exceed the standards in ch. NR 103.

(c) Temperatures at any point in waters not identified in pars. (a) or (b) may not exceed 86°F. Additionally, all conditions of ch. NR 103 shall be met.

Note: The department recognizes there are legitimate concerns that not all wetlands and ephemeral streams are the biological equivalents of other limited aquatic life waters, and is in the process of re-evaluating the wetland and ephemeral stream classifications to determine if and when full fish and aquatic life conditions should be applied.

NR 102.25 Ambient temperatures and water quality criteria for the protection of fish and other aquatic life. (1) GENERAL. In the absence of site-specific ambient temperature data or water quality criteria as determine in ss. NR 102.26 or 102.27, respectively, the applicable ambient temperatures, sub-lethal water quality criteria, and acute water quality criteria shall be as specified in subs. (2) to (5). For determinations made in subs. (2) to (5), all of the following conditions shall apply:

(a) The ambient temperature, sub-lethal water quality criterion, and acute water quality criterion specified for any calendar month shall be applied simultaneously to establish the protection needed for each identified fish and other aquatic life use.

(b) Sub-lethal water quality criteria are to be applied as maximum weekly average temperatures.

(c) Acute water quality criteria are to be applied as daily maximum temperatures.

(d) Water quality criteria for temperature shall be applied in accordance with the mixing zone provisions of s. NR 102.05(3).

(e) Final acute and sub-lethal water quality criteria for temperature specified in or developed pursuant to ss. NR 102.24 to 102.26 shall not be exceeded at any point outside the mixing zone. Additionally, site-specific mixing zone studies may be required when deemed appropriate by the department.

(2) NON-SPECIFIC WATERS. The values listed in Table 2 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for temperature for the protection of fish and aquatic life unless other values specified in subs. (3) to (5) are applicable or approved by the department pursuant to ss. NR 102.26 or 102.27.

Table 2
Ambient Temperatures and Water Quality Criteria for Temperature for Non-Specific Waters
(All values are expressed as degrees Fahrenheit)

Month	Cold ⁴			Warm - Large ⁵			Warm - Small ⁶			LFF ⁷		
	Ta ¹	SL ²	A ³	Ta	SL	A	Ta	SL	A	Ta	SL	A
JAN	35	47	68	33	49	76	33	49	76	37	54	78
FEB	36	47	68	33	50	76	34	50	76	39	54	79
MAR	39	51	69	36	52	76	38	52	77	43	57	80
APR	47	57	70	46	55	79	48	55	79	50	63	81
MAY	56	63	72	60	65	82	58	65	82	59	70	84
JUN	62	67	72	71	75	85	66	76	84	64	77	85
JUL	64	67	73	75	80	86	69	81	85	69	81	86
AUG	63	65	73	74	79	86	67	81	84	68	79	86
SEP	57	60	72	65	72	84	60	73	82	63	73	85
OCT	49	53	70	52	61	80	50	61	80	55	63	83
NOV	41	48	69	39	50	77	40	49	77	46	54	80
DEC	37	47	69	33	49	76	35	49	76	40	54	79

¹ Ta = ambient temperature

² SL = sub-lethal criteria

³ A = acute criteria

⁴ Cold = waters with a fish and aquatic life use designation of “cold water community”

⁵ Warm - Large = waters with a fish and aquatic life use designation of “warm water sport fish community” or “warm water forage fish community” and unidirectional 7Q10 flows ≥ 200 cfs (129 mgd)

⁶ Warm - Small = waters with a fish and aquatic life use designation of “warm sport fish community” or “warm water forage fish community” and unidirectional 7Q10 flows < 200 cfs (129 mgd)

⁷ LFF = waters with a fish and aquatic life use designation of “limited forage fish community”

(3) SPECIFIC LARGE RIVERS. The values listed in Table 3 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for temperature for the protection of fish and aquatic life for the identified water segments unless other values are approved by the department pursuant to ss. NR 102.26 or 102.27.

Table 3
Ambient Temperatures and Water Quality Criteria for Temperature for Specific Large Rivers
(All values are expressed as degrees Fahrenheit)

Mississippi River ⁴	Rock River ⁵	Upper Wisconsin River ⁶	Lower Wisconsin River ⁷	Lower Fox River ⁸
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Month	Ta ¹	SL ²	A ³	Ta	SL	A									
JAN	32	49	75	33	49	76	33	49	76	32	49	75	35	49	76
FEB	33	50	76	35	50	76	33	50	76	32	50	75	35	50	76
MAR	36	52	76	38	52	77	35	52	76	37	52	77	38	52	77
APR	47	55	79	49	55	79	44	55	78	48	55	79	50	55	80
MAY	60	65	82	64	65	84	60	65	82	61	65	83	62	65	83
JUN	72	75	85	71	75	85	70	75	85	71	75	85	73	76	85
JUL	76	80	86	74	79	86	75	80	86	75	80	86	77	81	87
AUG	76	79	86	73	79	85	73	79	85	74	79	86	76	80	86
SEP	67	73	84	66	72	84	65	72	84	67	72	84	68	73	85
OCT	54	61	81	54	61	81	51	61	80	53	61	80	53	61	80
NOV	40	50	77	40	50	77	39	50	77	40	50	77	42	50	78
DEC	33	49	76	34	49	76	33	49	76	33	49	76	35	49	76

¹ Ta = ambient temperature

² SL = sub-lethal criteria

³ A = acute criteria

⁴ Mississippi River = applies to any portion of Wisconsin's Mississippi River reach

⁵ Rock River = applies to waters downstream of Lake Koshkonong

⁶ Upper Wisconsin River = applies to waters upstream of Petenwell Dam

⁷ Lower Wisconsin River = applies to waters downstream of Petenwell Dam to the confluence with the Mississippi River

⁸ Lower Fox River = applies to waters downstream of the Lake Winnebago outlet

(4) INLAND LAKES AND IMPOUNDMENTS. The values listed in Table 4 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for temperature for the protection of fish and aquatic life for inland lakes and impoundments unless other values are approved by the department pursuant to ss. NR 102.26 or 102.27.

Table 4
Ambient Temperatures and Water Quality Criteria for Temperature for
Inland Lakes and Impoundments
(All values are expressed as degrees Fahrenheit)

Month	Northern ⁴			Southern ⁵		
	Ta ¹	SL ²	A ³	Ta	SL	A
JAN	35	49	76	35	49	77
FEB	34	52	76	39	52	78
MAR	35	55	76	41	55	78
APR	41	60	78	49	60	80
MAY	55	67	81	58	68	82
JUN	67	75	85	70	75	86
JUL	72	79	86	77	80	87
AUG	71	79	86	76	80	87
SEP	63	72	84	67	73	85
OCT	52	61	80	54	61	81
NOV	43	50	78	42	50	78
DEC	35	49	76	35	49	77

¹ Ta = ambient temperature

² SL = sub-lethal criteria

³ A = acute criteria

⁴ Northern = applicable for those lakes and impoundments north of State Highway 10

⁵ Southern = applicable for those lakes and impoundments south of State Highway 10

(5) GREAT LAKES WATERS. The values listed in Table 5 shall be the applicable ambient temperatures, sub-lethal and acute water quality criteria for the protection of fish and aquatic life for Great Lakes waters identified in s. NR 102.22(5) unless other values are approved by the department pursuant to ss. NR 102.26 or 102.27.

Table 5
Ambient Temperatures and Water Quality Criteria for Temperature for
Great Lakes Waters of Wisconsin
(All values are expressed as degrees Fahrenheit)

Month	Green Bay						Lake Michigan						Lake Superior ⁸			Chequamegon Bay ⁹		
	Southern ⁴			Northern ⁵			Northern ⁶			Southern ⁷			Ta	SL	A	Ta	SL	A
	Ta ¹	SL ²	A ³	Ta	SL	A	Ta	SL	A	Ta	SL	A	Ta	SL	A	Ta	SL	A
JAN	35	49	75	35	43	69	34	43	69	35	43	69	35	41	69	35	41	69
FEB	35	52	75	35	47	69	33	47	69	34	46	69	34	46	69	35	46	69
MAR	41	54	77	36	52	70	35	52	69	37	52	70	34	51	69	35	51	69
APR	47	58	79	40	57	71	39	58	70	43	59	70	35	57	69	38	57	69
MAY	56	64	81	48	63	72	44	64	71	48	65	72	41	63	70	50	63	72
JUN	66	70	83	57	68	75	48	69	72	54	70	73	49	69	72	59	69	74
JUL	70	75	83	62	71	77	53	71	73	59	71	74	55	72	73	62	72	75
AUG	70	75	83	64	71	78	56	69	73	63	70	76	57	71	73	64	71	76
SEP	65	70	83	61	66	77	53	64	73	60	64	74	57	64	73	60	66	74
OCT	54	60	80	54	58	74	48	55	72	53	57	73	50	55	72	49	57	72
NOV	39	49	76	44	49	71	42	47	70	45	49	71	43	45	70	39	48	70
DEC	37	46	75	37	44	70	36	44	69	38	44	70	38	42	69	35	43	69

¹ Ta = ambient temperature

² SL = sub-lethal criteria

³ A = acute criteria

⁴ Southern Green Bay = waters south of the Brown County line to the Fox River mouth

⁵ Northern Green Bay = waters north of the Brown County line to the northernmost point on Washington Island

⁶ Northern Lake Michigan = waters north of the Milwaukee River mouth (downtown Milwaukee)

⁷ Southern Lake Michigan = waters south of the Milwaukee River mouth (downtown Milwaukee)

⁸ Lake Superior = waters in Lake Superior except those in Chequamegon Bay

⁹ Chequamegon Bay = waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

NR 102.26 Site-specific ambient temperatures. (1) DEVELOPMENT OF SITE-SPECIFIC AMBIENT TEMPERATURES. An owner or operator of a facility with a discharge subject to regulation under this chapter may submit a request to the department for the determination of a site-specific ambient temperature. The department may approve, disapprove or approve with modifications the request for the site-specific ambient temperature. The request for site-specific ambient temperatures shall include all of the following:

(a) A demonstration that the data used to derive the ambient temperatures in s. NR 102.25 do not apply to the specific water segment or body in question.

(b) Site-specific water temperature that represents the ambient temperature of the site. For purposes of this paragraph, data must be:

1. Collected daily using a continuous recorder or similar device that takes measurements at least hourly, except as follows:

i. Monthly data sets may be missing no more than 10 days of temperature data for the months of December through February,

ii. Monthly data sets may be missing no more than 5 days of temperature data for the months of March through November.

2. Collected for each month in which the request for site-specific ambient temperatures is requested,

3. Collected at any time since October 1987,

4. Collected for at least 2 consecutive years.

(c) Calculated daily average temperatures from the data from par. (b).

(d) Calculated monthly average temperatures from the daily average temperatures in par. (c) for each individual month that data has been collected. Alternatively, calculated monthly average temperatures directly from the data from par. (b) for each individual month.

(e) All individual monthly averages organized by month.

(f) A determination of the monthly site-specific ambient temperatures by calculating the geometric mean of all monthly averages for each given month.

(g) Alternative methods for developing site-specific ambient temperatures, if the department approves the method as representative of ambient temperatures as those in pars. (a) to (d).

(2) USE OF SITE-SPECIFIC AMBIENT TEMPERATURES TO ESTABLISH ACUTE CRITERIA. Once site-specific ambient temperatures have been approved by the department in accordance with sub. (1), the acute water quality criteria listed in Table 6 will be applicable for the protection of fish and other aquatic life.

(3) USE OF SITE-SPECIFIC AMBIENT TEMPERATURES TO ESTABLISH SUB-LETHAL CRITERIA. Once site-specific ambient temperatures have been approved by the department in accordance with sub. (1), the sub-lethal water quality criteria applicable for the protection of fish and other aquatic life shall be calculated as follows:

(a) Use Table 7 to determine the appropriate sub-lethal criteria for the fish and other aquatic life use.

(b) Modify the sub-lethal criteria as follows:

1. If a sub-lethal criterion from par. (a) is less than the site-specific ambient temperature from sub. (1) for a given month, increase the sub-lethal criterion to be equal with the site-specific ambient temperature.

2. If a sub-lethal criterion from par. (a) is greater than an acute criterion for a given month from sub. (2) decrease the sub-lethal criterion to be equal with the acute criterion.

(c) Perform a fifth order polynomial regression of the 12 monthly sub-lethal criteria resulting from par. (b). Using the resulting equation of the regression, calculate the final sub-lethal criteria for each month by replacing the “x” variables in the equation with a numeric representation for each month, where January “x” = 1, for February “x” = 2, ... and for December “x” = 12.

(d) The final sub-lethal criteria from par. (c) shall be used in combination with the site-specific ambient temperatures developed in sub. (1) and the acute criteria determined in sub. (2).

Table 6
Acute Criteria Across All Ambient Temperatures
(All values are expressed as degrees Fahrenheit)

1 Ta	Inland Waters					Great Lakes Waters					
	2 Cold	3 Warm	4 LFF	5 N Lake	6 S Lake	7 SGB	8 NGB	9 NLKMI	10 SLKMI	11 LKSUP	12 CB
32	68	75	77	75	76	74	69	69	69	68	68
33	68	76	77	76	76	74	69	69	69	69	69
34	68	76	77	76	76	75	69	69	69	69	69
35	68	76	77	76	77	75	69	69	69	69	69
36	68	76	78	76	77	75	70	69	69	69	69
37	69	77	78	77	77	75	70	70	70	69	69
38	69	77	78	77	77	76	70	70	70	69	69
39	69	77	79	77	78	76	71	70	70	70	70
40	69	77	79	77	78	76	71	70	70	70	70
41	69	78	79	78	78	77	71	70	70	70	70
42	69	78	79	78	78	77	71	70	70	70	70
43	69	78	80	78	78	77	71	70	70	70	70
44	70	78	80	78	79	78	71	71	71	71	71
45	70	79	80	79	79	78	71	71	71	71	71
46	70	79	80	79	79	78	72	72	72	71	71
47	70	79	81	79	80	79	72	72	72	71	71
48	70	79	81	79	80	79	72	72	72	72	72
49	70	79	81	80	80	79	73	72	72	72	72
50	70	80	81	80	80	79	73	73	73	72	72
51	71	80	82	80	81	80	73	73	73	72	72
52	71	80	82	80	81	80	73	73	73	72	72
53	71	80	82	81	81	80	74	73	73	72	72
54	71	81	82	81	81	80	74	73	73	73	73
55	71	81	83	81	82	81	74	73	73	73	73
56	72	81	83	81	82	81	75	73	73	73	73
57	72	82	83	82	82	81	75	73	73	73	73
58	72	82	83	82	82	81	75	74	74	73	73
59	72	82	84	83	83	81	76	74	74	74	74
60	72	82	84	83	83	82	76	74	74	74	74
61	72	83	84	83	83	82	77	75	75	74	74
62	72	83	84	83	84	82	77	75	75	75	75
63	73	83	85	84	84	82	78	76	76	75	75
64	73	84	85	84	85	82	78	77	77	76	76
65	73	84	85	84	85	83	78	77	77	76	76
66	73	84	85	85	85	83	79	78	78	77	77
67	74	84	86	85	85	83	79	78	78	77	77
68	74	85	86	85	85	83	80	79	79	78	78
69	74	85	86	85	86	83	80	79	79	78	78
70	74	85	86	86	86	83	81	80	80	79	79
71	74	85	87	86	86	84	81	81	81	79	79
72	75	85	87	86	86	84	82	81	81	80	80
73	75	85	87	86	86	84	82	82	82	80	80
74	75	86	87	86	87	84	82	82	82	81	81
75	75	86	88	87	87	85	83	83	83	81	81
76		86	88	87	87	85	83	83	83	82	82
77		87	88	87	87	85	84	84	84	83	83
78		87	88	87	88	86	84	84	84	83	83
79		87	89	88	88	86	84	84	84	83	83
80		87	89	88	88	86	84	84	84	83	83
81		88	89	88	88	86	84	84	84	83	83
82		88	89	88	89	87	84	84	84	84	84
83		88	90	89	89	87	84	84	84	84	84
84		88	90	89	89	88	85	85	85	84	84
85		89	90	89	89	88	85	85	85		
86		89	90	89	90	89					
87		89	91	90	90	89					
88		90	91	90	90	89					
89		90	91	90	91	89					
90		91	91	91	91						
91		91	92	91	92						
92			92		92						

- ¹ Ta = ambient temperature
² Cold = waters with a fish and other aquatic life use designation of “cold water community”
³ Warm = waters with a fish and other aquatic life use designation of “warm water sport fish community” or “warm water forage fish community”
⁴ LFF = waters with a designation of “limited forage fish community”
⁵ N Lake = applicable for those lakes north of State Highway 10
⁶ S Lake = applicable for those lakes south of State Highway 10
⁷ SGB = Green Bay waters south of the Brown County line to the Fox River mouth
⁸ NGB = Green Bay waters north of the Brown County line to the northernmost point on Washington Island
⁹ NLKMI = Lake Michigan waters north of the Milwaukee River mouth (downtown Milwaukee)
¹⁰ SLKMI = Lake Michigan waters south of the Milwaukee River mouth (downtown Milwaukee)
¹¹ LKSUP = waters in Lake Superior except those in Chequamegon Bay
¹² CB = Chequamegon Bay waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

Table 7
Raw Monthly Sub-Lethal Criteria for Use In Determining Final Sub-Lethal Criteria with Site-Specific Ambient Temperatures
(All values are expressed as degrees Fahrenheit)

Month	C	W-L	W-S	LFF	NIL	SIL	MR	RR	UWR
January	47	50	50	54	50	50	50	50	50
February	45	50	50	54	50	50	50	50	50
March	53	54	54	54	54	54	54	54	54
April	59	65	65	64	63	64	65	65	65
May	59	70	70	75	70	70	70	70	70
June	67	72	72	75	72	72	72	72	72
July	68	74	74	75	75	74	74	74	74
August	68	78	78	77	77	77	78	78	78
September	52	87	87	92	87	87	87	87	87
October	52	54	54	54	54	54	54	54	54
November	50	50	50	54	50	50	50	50	50
December	46	50	50	54	50	50	50	50	50

Month	LWR	LFR	SGB	NGB	SLM	NLM	LS	CB
January	50	50	50	44	44	44	42	42
February	50	50	50	43	43	43	43	43
March	54	54	54	54	52	54	52	52
April	65	65	60	59	61	60	58	58
May	70	70	66	64	67	65	65	65
June	72	72	70	67	68	67	67	67
July	74	74	70	68	68	68	69	69
August	78	78	71	67	67	67	69	69
September	87	87	83	79	79	79	79	79
October	54	54	50	50	50	50	45	54
November	50	50	47	47	47	47	44	46
December	50	50	47	45	45	45	43	44

C = Cold = waters with a fish and other aquatic life use designation of “cold water community”
W-L = Warm -Large = waters with a fish and other aquatic life use designation of “warm water sport fish community” or “warm water forage fish community” and unidirectional 7Q10 flows \geq 200 cfs (129 mgd)
W-S = Warm - Small = waters with a fish and other aquatic life use designation of “warm water sport fish community” or “warm water forage fish community” and unidirectional 7Q10 flows $<$ 200 cfs (129 mgd)
LFF = waters with a designation of “limited forage fish community”

NIL = Northern Inland Lakes = applicable for those lakes north of State Highway 10
SIL = Southern Inland Lakes = applicable for those lakes south of State Highway 10
MR = Mississippi River = applies to any portion of Wisconsin's Mississippi River reach
RR = Rock River = applies to waters downstream of Lake Koshkonong
UWR = Upper Wisconsin River = applies to waters upstream of Petenwell Dam
LWR = Lower Wisconsin River = applies to waters downstream of Petenwell Dam to the confluence with the Mississippi River
LFR = Lower Fox River = applies to waters downstream of the Lake Winnebago outlet
SGB = Green Bay waters south of the Brown County line to the Fox River mouth
NGB = Green Bay waters north of the Brown County line to the northernmost point on Washington Island
SLM = Lake Michigan waters south of the Milwaukee River mouth (downtown Milwaukee)
NLM = Lake Michigan waters north of the Milwaukee River mouth (downtown Milwaukee)
LS = Lake Superior = waters in Lake Superior except those in Chequamegon Bay
CB = Chequamegon Bay = waters within the region enclosed by Chequamegon Point and a straight line west to the mainland

NR 102.27 Site-specific water quality criteria. (1) GENERAL. A water quality criterion developed pursuant to this subchapter may be modified by the department for a particular surface water segment or waterbody. The site-specific water quality criterion shall only be applicable to the identified surface water segment or body. The development of a site-specific water quality criterion shall include all of the following:

(a) Information showing data used to derive the water quality criterion do not apply to the specific water segment or body.

(b) Consideration of the guidance provided in Chapter 3.7 of the Water Quality Standards Handbook, Second Edition, U.S. EPA, 8/15/1994.

(c) Information showing the site-specific water quality criterion is consistent with the guidelines provided in sub. (2).

(d) Any additional information necessary to derive site-specific water quality criterion.

Note: Site-specific water quality criteria are subject to U.S. Environmental Protection Agency approval under federal regulations.

(2) SITE-SPECIFIC WATER QUALITY CRITERIA DEVELOPMENT. (a) The department may promulgate site-specific water quality criteria for temperature when it determines that the data used to derive the water quality criteria published in this subchapter do not apply to the specific water segment or body in question. In making the determination, the same approach used to develop the water quality criteria in s. NR 102.25 may be used to develop site-specific water quality criteria by recalculating the water quality criteria based upon the actual species that are associated with the specific site.

(b) Alternative methods for developing site-specific water quality criteria may be used if it is determined that those alternative methods will protect against sub-lethal and acute impacts in the fish and aquatic life community of a specific site.

(c) A water quality criterion developed via alternative methods shall be reviewed by the department and shall be adopted as a rule under this chapter before it can be applied on a site-specific basis.

(3) Any water quality criterion modified for site-specific conditions shall be promulgated by the department and approved by the U.S. Environmental Protection Agency before it is applied on a site-specific basis.

NR 102.28 Cold shock standard. Water temperatures of discharges shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock.

NR 102.29 Rate of temperature change standard. Temperature of a water of the state or a discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

NR 102.30 Variances to water quality standards for temperature. The provisions of ss. 283.15 and 283.17, Stats., are applicable to the water quality standards in this subchapter.

SECTION 25. Chapter NR 106 title is amended to read:

CHAPTER NR 106

PROCEDURES FOR CALCULATING WATER QUALITY BASED EFFLUENT LIMITATIONS FOR TOXIC AND ORGANOLEPTIC SUBSTANCES DISCHARGED POINT SOURCE DISCHARGES TO SURFACE WATERS

SECTION 26. Chapter NR 106, Subch. V is created to read:

Subchapter V – Effluent Limitations for Temperature

NR 106.50 Purpose. The purpose of this subchapter is to specify how the department will calculate water quality-based effluent limitations for temperature under s. 283.13(5), Stats., and to specify how the department will determine when the limitations will be included in Wisconsin pollution discharge elimination system (WPDES) permits. Water quality-based effluent limitations for temperature are necessary to assure attainment and maintenance of surface water quality standards for temperature established in accordance with s. 281.15(1), Stats., and set forth in subch. II of ch. NR 102.

NR 106.51 Applicability. This subchapter applies to point sources that discharge cooling water, non-contact cooling water, or other wastewater to surface waters of the state if the discharge contains an associated heat load or is elevated in temperature relative to the ambient temperature of the receiving water. The procedures for calculation of effluent limitations identified in this subchapter do not apply to storm water discharges. Effluent limitations determined under this subchapter supersede any temperature limitations listed in s. NR 104.06(2)(b).

Note: Section 283.11(2)(b), Stats., states that rules concerning storm water discharges may be no more stringent than the requirements under the federal water pollution control act and regulations adopted under that act. Storm water pollution prevention plans may address thermal issues on a case-by-case basis.

Note: The department will use enforcement discretion whenever there are exceedances of effluent temperature limitations in a WPDES permit for an electric generating facility during an energy emergency warning or when an energy emergency event has been declared under a Federal Energy Regulatory Commission order (Standard EOP-002, North American Electric Reliability Corporation).

NR 106.52 Definitions. In this subchapter, the following definitions are applicable to terms used:

(1) “Ambient temperature” means the typical existing temperature of a surface water outside the direct influence of any point source discharge, which may include daily and seasonal changes.

(2) “cfs” means cubic feet per second, usually pertaining to stream or effluent flow.

(3) “Cold shock” means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavioral or physiological performance and may lead to death.

(4) “Daily maximum effluent temperature” means the highest temperature measured in a calendar day.

(5) “Daily maximum effluent temperature limitation” means the daily maximum effluent temperature limitation established in a permit.

(6) “mgd” means million gallons per day, usually pertaining to stream or effluent flow.

(7) “New facility” means any new point source facility or new point source discharge that commences operation after the effective date of this subchapter ...[revisor insert date].

(8) “Seven-day rolling average effluent flow” means the arithmetic average of the effluent flow measured on a particular day and the 6 preceding days within that calendar month.

(9) “Water quality standards” means applicable water quality standards set forth in chs. NR 102–104, or any federally promulgated water quality standards applicable to surface waters of the state.

(10) “Weekly average effluent temperature” means the arithmetic mean of all daily maximum effluent temperature values recorded in a calendar week, Sunday – Saturday.

(11) “Weekly average effluent temperature limitation” means the maximum allowable weekly average temperature determined as the arithmetic mean of all daily maximum effluent temperature values recorded in a calendar week, Sunday – Saturday.

(12) “WPDES” or “WPDES permit” means Wisconsin pollutant discharge elimination system permit issued under ch. 283, Stats., but does not include storm water permits issued under s. 283.35, Stats.

(13) “WQBEL” means water quality-based effluent limitation.

NR 106.53 Parameters used to establish water quality-based effluent limitations for temperature. (1) RECEIVING WATER FLOW RATE (Q_s). The value of receiving water flow rate (Q_s) used to determine effluent limitations for discharges to flowing waters shall be as follows:

(a) Q_s shall equal $\frac{1}{4}$ of the average minimum 7-day flow which occurs once in 10 years ($\frac{1}{4}$ 7-day Q_{10}) or, if sufficient information is available to calculate a biologically based receiving water design flow, $\frac{1}{4}$ of the flow which prevents an excursion from the applicable water quality criteria using a duration of 4 days and a frequency of less than once every 3 years ($\frac{1}{4}$ 4-day, 3-year biological flow).

(b) Q_s may be reduced from those values calculated in par. (a) wherever natural receiving water flow is significantly altered by flow regulation or other types of water diversion structures.

(c) The discharger shall be allowed to demonstrate, through appropriate and reasonable methods that an adequate passageway for movement of aquatic life exists in the cross-section of the receiving water or that dilution is accomplished rapidly such that the extent of the mixing zone is minimized. In complex situations, the department may require that the demonstration under this paragraph include water quality modeling or field dispersion studies.

(d) Based upon the results of a demonstration submitted under par. (c), Q_s may be modified from that specified in pars. (a) or (b). A modified Q_s shall be determined on a case-by-case basis and shall be approved in writing by the department. Q_s may not exceed the larger of the 7-day Q_{10} or the 4-day, 3-year

biologically based design flow, except when a permit allows the use of real-time data for the determination of water quality based effluent limitations for temperature, as provided in NR 106.54(4).

(e) The value of Q_s may not exceed that of par. (a) if the department determines that the discharge has a potential to jeopardize the continued existence of any endangered or threatened species listed under ch. NR 27 or section 7 of the federal Endangered Species Act, 16 USC 1536.

(2) **EFFLUENT FLOW RATE (Q_e).** The value of effluent flow rate (Q_e) used to determine effluent temperature limitations shall be as follows:

(a) *Flow Ratios:* For purposes of determining a flow ratio pursuant to s. NR 106.55(6)(a), Q_e shall equal:

1. For discharges subject to ch. NR 210 For and which discharge for 24 hours per day on a year-round basis, Q_e shall equal the maximum effluent flow, expressed as a daily average, that is anticipated to occur for 12 continuous months during the design life of the treatment facility unless it is demonstrated to the department that such a design flow rate is not representative of projected flows at the facility.

2. For all other dischargers not subject to ch. NR 210, Q_e shall equal the maximum effluent flow, expressed as a daily average, that has occurred for 12 continuous months and represents normal operations

3. For seasonal discharges, discharges proportional to stream flow, or other unusual discharge, Q_e shall be determined on a case-by-case basis.

(b) *Acute temperature limitation:* For purposes of determining acute temperature limitations pursuant to s. NR 106.55(6)(b), Q_{ea} shall be the highest daily maximum effluent flow rate, expressed as mgd, which has occurred for each calendar month of the year and represents normal operating conditions.

(b) *Sub-lethal temperature limitation:* For purposes of determining sub-lethal temperature limitations pursuant to s. NR 106.55(6)(a), (Q_{esl}) shall be the highest 7-day rolling average effluent flow rate within a calendar month, expressed as mgd, which has occurred for each calendar month of the year and represents normal operating conditions.

(c) *Non-typical effluent flows:* For purposes of determining effluent temperature limitations pursuant to s. NR 106.55(6)(a) and s. NR 106.55(7), Q_{ea} and Q_{esl} may be determined on a case-by-case basis for seasonal discharges, discharges proportional to stream flow, or other unusual discharge situations.

NR 106.54 Representative effluent temperature data. (1) The representative daily maximum effluent temperature is the highest effluent temperatures known or expected to occur on any day under normal operating conditions at the time of permit issuance. Representative daily maximum effluent temperature shall be measured at a frequency of not less than once per week whenever a discharge occurs.

(2) The representative weekly average effluent temperature is the highest weekly average effluent temperature known or expected to occur under normal operating conditions at the time of permit issuance.

(3) The department may require a permittee to collect additional data if the department determines that the requirements of subs. (1) and (2) do not provide adequate data to document the operational variability of a discharge.

(4) A permittee may request, at the time of application for a WPDES permit, calculation of effluent temperature limitations to be included in a permit based on real-time data. Any permittee that

makes such a request shall provide effluent flow, effluent temperature, receiving water flow, and receiving water temperature at a frequency no less than one result per hour that is representative of normal operating conditions, including variability.

NR 106.55 Determination of water quality-based effluent limitations for temperature in WPDES permits. (1) GENERAL. The department shall determine water quality-based effluent limitations for temperature to attain and maintain water quality standards and criteria specified in or determined according to procedures in subch. II of NR 102.

(2) LIMITATIONS FOR WATERS DESIGNATED AS LIMITED AQUATIC LIFE. The daily maximum effluent temperature limitation shall be 86°F for discharges to surface waters classified as limited aquatic life according to s. NR 104.02(3)(b)1. and as defined in s. NR 104.02(1), except for those classified as wastewater effluent channels and for wetlands regulated under ch. NR 103.

(3) LIMITATIONS FOR WATERS DESIGNATED AS WASTEWATER EFFLUENT CHANNELS. The daily maximum effluent temperature limitation shall be 120°F for discharges to surface waters classified as limited aquatic life wastewater effluent channels according to s. NR 104.02(3)(b)1. and as defined in s. NR 104.02(1)(d).

(4) LIMITATIONS FOR WETLANDS. Effluent temperature limitations shall be established for wetlands on a case-by-case basis to meet the water quality standards provided in ch. NR 103, but in no case shall the effluent temperature limitation be greater than 120°F.

(5) LIMITATIONS FOR DISCHARGES TO STORM SEWERS. (a) *General.* A permittee may request, at time of permit application, an effluent limitation greater than the effluent temperature limitations required under subs. (2) to (4), (6) or (7) if the discharge is to a storm sewer or other storm water conveyance channel. The permittee may request that the higher effluent limitation be greater than 120°F if the permittee is able to demonstrate to the satisfaction of the department that the heated effluent is not discharged in a manner that will cause a potential for scalding of humans. An effluent temperature limitation established under this subsection shall be determined according to the following equation:

$$T_{ss} = T_{dir} + (HLV \times (L/100))$$

Where: T_{ss} = Effluent temperature limitation for discharge to a storm sewer in degrees Fahrenheit

T_{dir} = Effluent temperature limitation determined under subs. (2), (3), (4), (6) or (7) in degrees Fahrenheit

HLV = Heat loss value assumed to be 0.25 unless an alternative value is determined to be representative of site-specific conditions

L = Length (in feet) of the storm sewer or other storm water conveyance channel between the effluent discharge location and the point at which the storm sewer or storm water conveyance channel discharges to a surface water of the state

(b) *Alternative heat loss value.* An alternative heat loss value (HLV) may be used in the equation in par. (a). The alternative value shall be representative of seasonal influences on heat loss and be based on a comparison of effluent temperature at the location of discharge to the storm sewer or storm water conveyance channel and the point at which the storm sewer or storm water conveyance channel discharges to a surface water of the state.

(c) *Site-specific information.* The department may use available site-specific information to determine an alternative heat loss value or other data demonstrating the amount of heat loss in a storm sewer to establish an effluent temperature limitation for discharges to a storm sewer.

(6) LIMITATIONS FOR RECEIVING WATERS WITH UNIDIRECTIONAL FLOW NOT DESIGNATED AS LIMITED AQUATIC LIFE. Except as provided in subs. (2) to (5), the department shall establish water quality-based effluent limitations to ensure that effluent is not discharged at elevated temperatures that may adversely affect humans or aquatic life at or near the point of discharge for discharges to surface waters with unidirectional flow.

(a) *Flow ratio categories.* Effluent temperature limitations shall be established based upon the designated use of the water and the ratio of streamflow to effluent flow as determined in Table 1 below. Effluent flow shall be equal to the value specified in s. NR 106.53(2)(a).

Table 1

Flow Ratio Categories		
Warm Water and Limited Forage Fish Designated Waters	Cold Water Designated Waters	Effluent Temperature Limitation
$Q_s:Q_e \geq 20:1$	$Q_s:Q_e \geq 30:1$	120°F
$20:1 > Q_s:Q_e > 2:1$	$30:1 > Q_s:Q_e > 2.5:1$	120°F or the sub-lethal WQBEL as calculated in par. (b), whichever is lower
$Q_s:Q_e \leq 2:1$	$Q_s:Q_e \leq 2.5:1$	Sub-lethal and acute WQBELs as calculated in par. (b)

(b) *Calculation of limitations.* The methods described in this paragraph apply to the determination of both acute and sub-lethal effluent temperature limitations. Water quality-based effluent temperature limitations to meet the requirements of this subsection shall be determined using the following procedures:

$$WQBEL = [((WQC - T_a)(Q_s + (1 - f)Q_e)) / Q_e] + T_a$$

Where:

- WQBEL = Water quality-based effluent temperature limitation (in degrees Fahrenheit)
- WQC = Water quality criteria (in degrees Fahrenheit) as defined in ss. NR 102.25 and 102.27
- T_a = Ambient temperature (in degrees Fahrenheit) as determined in ss. NR 102.25 and 102.26
- Q_s = Receiving water flow rate equal to ¼ 7-Q₁₀ or ¼ 4-day, 3-year biological flow as specified in s. NR 106.53(1)(a) unless an alternative receiving water flow rate has been determined in accordance with s. NR 106.53(1)(b) to (e)
- f = Fraction of the effluent flow that is withdrawn from the receiving water, where “f” ranges from 0 to 1 and is unitless
- Q_e = Effluent flow rate in mgd as specified in s. NR 106.53(2)(a)

(c) *Limitations for mussel control.* Short-term excursions from the effluent temperature limitation determined in this subsection may occur for the purposes of zebra or other mussel control if approved by the department and authorized in a permit on a case-by-case basis.

(d) *More stringent limitations.* The department shall establish more stringent effluent temperature limitations than those determined under the provisions of this subsection whenever it is demonstrated that the temperature of the discharge may cause or contribute to nonattainment of aquatic life uses and that more stringent limitations are necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in or on the body of water into which the discharge is made. Effluent temperature limitations under this paragraph shall be established whenever one or more of the mixing zone requirements in s. NR 102.05(3), as they apply to temperature, are not maintained.

(7) LIMITATIONS FOR INLAND LAKES, IMPOUNDMENTS AND GREAT LAKES WATERS. The department shall establish water quality-based effluent limitations to ensure that the effluent is not discharged at elevated temperatures that may adversely affect humans or aquatic life at or near the point of discharge for discharges to surface waters that are inland lakes, impoundments, or Great Lakes waters that do not exhibit unidirectional flow.

(a) *Limitations for mussel control.* Short-term excursions from the effluent temperature limitation determined in this subsection may occur for the purposes of zebra or other mussel control if approved by the department and authorized in a permit on a case-by-case basis.

(b) *Calculation of limitations.* The methods described in this paragraph apply to the determination of both acute and sub-lethal effluent temperature limitations. Water quality-based effluent temperature limitations to meet the requirements of this subsection shall be determined using the following procedures:

$$WQBEL = [(WQC - T_a)/(e^{-a})] + T_a$$

Where:

- WQBEL = Water quality-based effluent temperature limitation (in degrees Fahrenheit)
- WQC = Water quality criteria (in degrees Fahrenheit) as defined in ss. NR 102.25 to 27
- T_a = Ambient temperature (in degrees Fahrenheit) as determined in ss. NR 102.25 to 27
- e^{-a} = An empirical factor; “e” is the base of the natural logarithm and the exponent “a” is calculated as follows:

$$a = [(A)(54.7 + B(150))] / [(8,345,000)(Q_e)]$$

Where:

A = Area of mixing zone in square feet, as follows:

Maximum Area Allowed (square feet)	=	Water Body
31,416		inland lake or impoundment off-shore discharge
15,708		inland lake or impoundment shore discharge
15,708		Great Lakes harbor discharge

3,141,593 = Great Lakes off-shore discharge
 3,125,000 = Great Lakes shore discharge

The maximum area of the mixing zone is subject to all applicable portions of s. NR 102.05(3)

B = A coefficient which is a function of T_a as follows:

T_a	B
≤ 59.9	0.405
60-69.9	0.555
70-79.9	0.667
≥ 80	0.990

Q_e = Effluent flow rate in mgd as specified in s. NR 106.53(2)

(8) LIMITATIONS FOR DISCHARGES WITH FLUCTUATING OR VARIABLE EFFLUENT FLOW RATES. A permittees may request flow-related effluent temperature limitations for discharge flows that fluctuate or vary on a frequent basis. Flow-related effluent temperature limitations shall be determined as follows:

(a) At the time of permit application, the permittee shall submit representative minimum and maximum effluent flow data for the interval of variability for which effluent flow-related limitations are requested.

Note: For example, if the interval of variability is for a particular season or time of the year, then maximum and minimum effluent flow data submitted should be for that season.

(b) Effluent temperature limitations shall be determined following the procedures of subs. (6) or (7), as appropriate, using both the minimum and maximum effluent flow rates submitted in par. (a).

(c) Effluent temperature limitations determined in accordance with par. (b) shall be expressed in a permit as a function of effluent flow.

(d) Permits that contain flow-related effluent temperature limitations shall require daily monitoring of effluent temperature during times of discharge.

(9) LIMITATIONS TO PROTECT DOWNSTREAM WATERS. The department may calculate more stringent effluent temperature limitations than those determined under this section whenever more stringent limitations are necessary to attain or maintain water quality standards in downstream or other nearby waters that may be affected by the heated discharge.

(10) LIMITATIONS BASED ON SITE-SPECIFIC MIXING ZONE ANALYSIS. The department may calculate effluent temperature limitations that differ from those determined under this section. A request by the permittee for a site specific mixing zone shall include all of the following:

(a) A mixing zone analysis that details the full extent and condition of the mixing zone.

(b) A demonstration that such effluent temperature limitations meet all mixing zone provisions of s. NR 102.05(3).

(c) A demonstration that such effluent temperature limitations shall attain all aquatic life uses in the body of water into which the discharge is made.

(d) A demonstration that such effluent temperature limitations shall provide a level of protection equivalent to or better than that provided by the temperature water quality criteria in ch. NR 102.

(11) LIMITATIONS BASED ON INSTALLATION OF DIFFUSERS AND OTHER MECHANICAL DEVICES. The department may calculate effluent temperature limitations that differ from those determined under this section whenever the permittee installs diffusers or other mechanical devices used to ensure rapid mixing of effluent and significantly reduces or eliminates the size of the mixing zone. It shall be demonstrated that the resulting mixing zone meets all mixing zone provisions of s. NR 102.05(3), and that the resulting mixing zone will attain all aquatic life uses in the body of water into which the discharge is made and provide a level of protection equivalent to or better than that provided by the temperature water quality criteria in ch. NR 102.

(12) MORE STRINGENT LIMITATIONS. The department shall establish more stringent effluent temperature limitations than those determined under s. NR 106.55(2) to (11) whenever the department determines that the discharge may cause or contribute to non-attainment of s. NR 102.04(4)(e).

(13) LIMITATIONS BASED ON WATER QUALITY MODELS. The department may calculate water quality-based effluent limitations that differ from those specified in this section using water quality modeling submitted pursuant to s. NR 106.58.

NR 106.56 Establishment of water quality-based effluent limitations for temperature in WPDES permits. **(1) GENERAL.** The department shall use the methods in this section to determine the need to establish water quality-based effluent temperature limitations in a permit.

(2) REASONABLE POTENTIAL TO EXCEED AN ACUTE EFFLUENT LIMITATION. An acute water quality-based effluent limitation for temperature shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature for that month exceeds the acute water quality-based effluent limitation determined in s. NR 106.55. The representative daily maximum effluent temperature used in this subsection shall be the greater of the following:

(a) The highest recorded representative daily maximum effluent temperature as measured or determined according to s. NR 106.54(1).

(b) The projected 99th percentile of all representative daily maximum effluent temperatures as measured or determined according to s. NR 106.54(1).

(3) REASONABLE POTENTIAL TO EXCEED A SUB-LETHAL EFFLUENT LIMITATION. A sub-lethal water quality-based effluent limitation for temperature shall be established in a WPDES permit for each month in which the representative weekly average effluent temperature for that month exceeds the sub-lethal water quality-based effluent limitation calculated in s. NR 106.55. The representative weekly average effluent temperature used in this subsection shall be the greater of the following:

(a) The highest weekly average effluent temperature for the month as measured or determined according to s. NR 106.54(2).

(b) The projected 99th percentile of all representative weekly average effluent temperatures for the month as measured or determined according to s. NR 106.54(2).

(4) REASONABLE POTENTIAL TO EXCEED A LIMITED AQUATIC LIFE EFFLUENT LIMITATION. A daily maximum effluent temperature limitation of 86°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 86°F for discharges to limited aquatic life waters not classified as a wastewater effluent channel according to s. NR 104.02(1), storm sewers or as a wetland regulated under ch. NR 103.

(5) REASONABLE POTENTIAL TO EXCEED A WASTEWATER EFFLUENT CHANNEL EFFLUENT LIMITATION. A daily maximum effluent temperature limitation of 120°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 120°F for discharges to a wastewater effluent channel, as classified in s. NR 104.02(1).

(6) REASONABLE POTENTIAL TO EXCEED A STORM SEWER EFFLUENT LIMITATION. A daily maximum effluent temperature limitation greater than 120°F shall be established in a WPDES permit for a discharge to a storm sewer for each month in which the representative daily maximum effluent temperature exceeds the limitation determined according to the procedure in s. NR 106.55(5).

(7) REASONABLE POTENTIAL TO EXCEED A WETLAND EFFLUENT LIMITATION. A daily maximum or weekly average effluent temperature limitation shall be established in a WPDES permit for each month in which the representative daily maximum or weekly average effluent temperature, respectively, exceeds the limits for a discharge to a wetland determined according to the provisions in s. NR 106.55(4).

(8) REASONABLE POTENTIAL TO EXCEED LIMITATIONS FOR THE PROTECTION OF PUBLIC HEALTH AND WELFARE. A daily maximum effluent temperature limitation of 120°F shall be established in a WPDES permit for each month in which the representative daily maximum effluent temperature exceeds 120°F, unless the permittee demonstrates to the satisfaction of the department that the heated effluent is not discharged in a manner that will cause a potential for scalding of humans.

(9) LIMITATIONS TO PROTECT DOWNSTREAM WATERS. Whenever the department determines that more stringent effluent temperature limitations than those established according to subs. (1) through (6) are necessary to attain or maintain water quality standards in downstream or other adjacent waters and the representative daily maximum or weekly average effluent temperatures exceed the limitations, then more stringent effluent temperature limitations shall be established in a WPDES permit.

(10) LIMITATIONS TO PROTECT FOR COLD SHOCK. The department shall determine on a case-by-case basis if any additional conditions are necessary in a WPDES permit to protect against cold shock and in accordance with the standard specified in s. NR 102.28. Provisions under this subsection shall be in addition to the water quality-based effluent temperature limitations determined under this section.

(11) LIMITATIONS TO PROTECT FOR RATE OF TEMPERATURE CHANGE. The department shall determine on a case-by-case basis if any conditions are necessary in a WPDES permit to protect against detrimental health or reproductive effects to fish and aquatic life caused by excessive rates of temperature change.

(12) REPRESENTATIVE DATA UNAVAILABLE. Whenever after the effective date of this rule, ...[revisor insert date], the department issues or reissues a permit to a discharger for which representative effluent temperature data as described in s. NR 106.54 is not available, the following requirements shall be included in the issued or reissued permit:

(a) Monitoring to obtain representative effluent temperature as described in s. NR 106.54. Monitoring shall be required for a period of not less than one year. When effluent temperatures in any month are highly variable, monitoring for 2 years may be required. If the facility only operates during

certain portions of the year, representative effluent temperature shall be measured during the period of operation.

(b) Water quality-based effluent temperature limitations determined under applicable methods described in s. NR 106.55 and as determined necessary under any applicable provision of this section. Compliance with the limitations shall be attained as soon as reasonably possible, but no later than the expiration date of the permit. The department may modify the permit at any time during the permit term and establish a compliance date to attain effluent temperature limitations sooner than the expiration date of the permit.

(c) If, after the data collection required under par. (a), it is determined that an effluent temperature limitation is not necessary under any applicable provision of this section, the water quality-based effluent temperature limitations in the permit may not be effective. A condition shall be included in the permit that invalidates any effluent temperature limitations and the compliance schedule in the permit. Continued monitoring of effluent temperature may be required.

(13) MONITORING. The department shall establish on a case-by-case basis the monitoring and reporting frequency for temperature in a WPDES permit.

(14) LIMITATIONS IN PERMITS. Effluent temperature limitations of 86°F, 120°F or greater than 120°F determined necessary under subs. (4) to (7) shall be expressed in permits as daily maximum effluent temperature limitations.

(a) Acute effluent temperature limitations determined necessary under this section shall be expressed in permits as daily maximum effluent temperature limitations.

(b) Sub-lethal effluent temperature limitations determined necessary under this section shall be expressed in permits as weekly average effluent temperature limitations.

(c) In all cases, monitoring data collected for purposes of reporting and determining compliance shall be representative effluent temperature data as described in s. NR 106.54.

NR 106.57 Effluent limitations for multiple thermal discharges. Whenever the department determines that more than one thermal discharge may be adversely affecting the water quality of the same receiving water, the provisions of both this subchapter and s. NR 106.11 shall be used to calculate the combined allowable heat load from the discharges necessary to meet the water quality criteria for temperature as specified in ch. NR 102. The resultant allowable thermal load shall be divided among the various discharges using an allocation method based on site-specific considerations. Whenever the department makes a determination under this subsection, the department shall specify the reasonable potential basis for any effluent temperature limitation and shall notify all permittees who may be affecting the water quality of the same receiving water of the determination and any limitations developed under this section. Any modifications to WPDES permits to account for multiple discharges shall include an opportunity for public comment pursuant to ch. 283, Stats.

NR 106.58 Effluent limitations based on water quality models. (1) At the time of permit application, a permittee may submit the results of scientifically defensible technical approaches, such as calibrated models and verified mathematical water quality models developed or adapted for a particular water body, simplified modeling approaches as outlined in “WATER QUALITY ASSESSMENT” (EPA-600/6-82-004), or other dynamic methods to be utilized in developing water quality-based effluent limitations.

(2) Data used to support the analyses conducted under sub. (1) shall be representative of the long-term characteristics of the receiving water and shall be collected in a manner consistent with requirements of ch. NR 219.

(3) The department shall review the results of the analyses conducted under sub. (1) on a case-by-case basis and shall determine the water quality-based effluent limitations necessary to ensure that the applicable water quality standards specified in ch. NR 102 are maintained.

(4) Effluent limitations approved under this section are in lieu of the procedures in ss. NR 106.55(5), (6), and (7), and are not modifications to the water quality criteria specified in ch. NR 102.

NR 106.59 Effluent limitations for temperature for permits issued to publicly or privately owned domestic sewage treatment works. (1) **APPLICABILITY.** This section applies to specific outfalls from permittees with discharges subject to ch. NR 210.

(2) **DEFINITIONS.** In this section, the following definitions are applicable to terms used:

(a) “Dissipative cooling” means the cooling effects associated with heat loss to the ambient water, the atmosphere and the surrounding environment.

(b) “Estimated daily maximum effluent temperature” means the highest temperature expected in a calendar day based on an average of effluent temperatures available. Available data may be from at least two other POTWs within a 100 mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW.

(c) “Existing POTW outfall” means any discharge structure that has been included in a WPDES permit issued prior to the effective date of this rule ...[revisor insert date], that was used to convey wastewater effluent to a surface water and has not been re-located.

(d) “New POTW discharge” means any point source subject to ch. NR 210 that has not received a WPDES permit from the department prior to the effective date of this rule ...[revisor insert date] or a permitted outfall re-located to a new receiving water after the effective date of this rule ...[revisor insert date].

(e) “POTW” means all publicly operated treatment works and privately owned domestic sewage treatment works subject to ch. NR 210.

(f) “Re-located POTW outfall” means any point source outfall structure associated with a previously issued WPDES permit that is moved or constructed after the effective date of this rule ...[revisor insert date] to convey wastewater to a the same receiving water where fish and other aquatic life are materially exposed to a modified thermal pollutant load.

Note: The department considers an outfall to be re-located when an assemblage of fish and other aquatic life are subjected to a heat load that they were not exposed to previously. In determining whether a change in location is a re-located outfall, the department shall consider the distance of the changed location, the potential for the heat load to adversely impact resident organisms, and whether or not the applicable provisions of s. NR 102.05(3) are satisfied.

(3) **ACUTE LIMITATIONS FOR EXISTING POTW OUTFALLS.** (a) The department shall establish acute effluent temperature limitations for an existing POTW outfall to surface waters classified as limited aquatic life whenever the representative daily maximum effluent temperature is greater than the applicable water quality criterion specified in s. NR 102.245.

(b) The department shall establish acute effluent temperature limitations for an existing POTW outfall to surface waters classified as cold water, warm water sport fish, warm water forage fish, or limited forage fish whenever the representative daily maximum effluent temperature is greater than the applicable water quality criterion specified in s. NR 102.25 or determined under s. NR 102.27. The applicable acute water quality criterion shall be based on representative ambient temperature of the receiving stream determined as follows:

1. Except as provided in subd. 2., the representative ambient temperature shall be equal to the ambient temperatures in s. NR 102.25 or approved under s. NR 102.26.

2. Where the Q_e of a permitted POTW is significantly greater than the Q_s of the receiving stream immediately upstream of the POTW outfall, the representative ambient temperature may be equal to the daily maximum effluent temperature.

3. The provisions of subd. 2 are not applicable to a permitted POTW with a discharge outfall that shares a mixing zone with an upstream discharger.

(4) SUB-LETHAL LIMITATIONS FOR EXISTING POTW OUTFALLS. The department may account for dissipative cooling of a POTW effluent in determining the need for sub-lethal effluent limitations. The department shall establish sub-lethal effluent temperature limitations for an existing POTW outfall whenever it is determined that the conditions of pars. (a) and (b) are met:

(a) The temperature of the effluent after mixing with the receiving water may be greater than the applicable sub-lethal water quality criterion specified in s. NR 102.25 or determined under s. NR 102.27. In making this determination, the department may review the following:

1. The physical characteristics of the receiving water including those related to mixing, turbulence, diffusion, dilution, dispersion, and heat dissipation.

2. The occurrence of other thermal mixing zones that may adversely affect the dissipative potential of the receiving water.

3. The variability of effluent temperature.

4. The expected difference between the ambient water temperature and the representative effluent temperature.

(b) Representative biological or physical site-specific data are available that demonstrate that the discharge of heated effluent causes or contributes to non-attainment of the aquatic life use of the water body to which the discharge is made.

(c) If the department determines that a sub-lethal effluent temperature limit is not necessary, a specific request for comment on the department's determination shall be included in the public notice for the proposed permit.

Note: A permittee for which the department has established effluent limitations under this section may request and be granted a variance from a water quality-based temperature limitation based on the procedures in ch. NR 200 and s. 283.15, Stats.

(5) ACUTE LIMITATIONS FOR NEW POTW DISCHARGES OR RE-LOCATED POTW OUTFALLS. (a) The department shall establish acute effluent temperature limitations for a new POTW discharge or re-

located POTW outfall to a surface water classified as limited aquatic life whenever the estimated daily maximum effluent temperature is greater than the applicable water quality criterion specified in s. NR 102.245.

(b) The department shall establish acute effluent temperature limitations for a new POTW discharge or re-located POTW outfall to a surface water classified as cold water, warm water sport fish, warm water forage fish, or limited forage fish whenever the estimated daily maximum effluent temperature is greater than the applicable water quality criterion specified in s. NR 102.25 or determined under s. NR 102.27. The applicable acute water quality criterion shall be equal to the ambient temperatures in s. NR 102.25 or approved under s. NR 102.26.

(6) SUB-LETHAL LIMITATIONS FOR NEW POTW DISCHARGES OR RE-LOCATED POTW OUTFALLS. The department may account for dissipative cooling of a POTW effluent in determining the need for sub-lethal effluent limitations. The department shall establish sub-lethal effluent temperature limitations for a new POTW discharge or a re-located POTW outfall whenever it is determined that the conditions of pars. (a) and (b) are met:

(a) The estimated daily maximum temperature of the effluent after mixing with the receiving water is greater than the applicable sub-lethal water quality criterion specified in s. NR 102.25 or determined under s. NR 102.27. In making this determination, the department may review the following:

1. The physical characteristics of the receiving water including those related to mixing, turbulence, diffusion, dilution, dispersion, and heat dissipation.

2. The occurrence of other thermal mixing zones that may adversely affect the dissipative potential of the receiving water.

3. The variability of effluent temperature.

4. The expected difference between the ambient water temperature and the estimated effluent temperature.

(b) Representative biological or physical site-specific data are available that demonstrate that the discharge of heated effluent may cause or contribute to non-attainment of the aquatic life use of the water body to which the discharge is made.

(c) If the department determines that a sub-lethal effluent temperature limit is not necessary for a new POTW discharge or a re-located POTW outfall, a specific request for comment on the department's determination shall be included in the public notice for the proposed permit.

(7) MONITORING. WPDES permits issued in accordance with this section that include effluent temperature limitations shall include a requirement to monitor effluent temperatures on a weekly basis.

NR 106.60 Effluent limitations for temperature for discharges from new facilities.

Except as provided in subch. VI, new facilities issued a WPDES permit after the effective date of this rule, ... [revisor insert date], shall be designed to meet applicable water quality-based effluent temperature limitations, as determined in this subchapter, on the effective date of the WPDES permit. The department may require a permittee to provide diffusers or other such devices to ensure rapid mixing of effluent into the water body receiving the discharge or may require a mixing zone analysis to demonstrate that the proposed mixing zone of the new POTW discharge will meet the mixing zone provisions of s. NR 102.05(3).

NR 106.61 General permit. (1) A general permit issued by the department that contains effluent temperature limitations and monitoring requirements for discharges of non-contact cooling water, non-contact condensate, boiler water blowdown, and boiler bleedoff directly to surface water, to a storm sewer, or for discharges to the land surface, or to groundwater shall include all of the following conditions:

(a) Procedures to determine effluent temperature limitations for individual discharges covered by the general permit in accordance with the provisions of this subchapter. For each facility covered by the general permit, the department shall establish effluent temperature limitations for the facility directly in the general permit or in the general permit discharge authorization letter to the permittee.

(b) Discharges to wetlands shall be allowed if, when granting coverage, the department determines that the requirements of ch. NR 103 are met.

(c) Discharges shall not be allowed if the receiving waterbody is an outstanding resource water or an exceptional resource water, as specified in ss. NR 102.10 and 102.11, respectively.

(d) Discharges to the land surface, to the groundwater or to storm water ponds shall have a daily maximum effluent temperature limitation of 120°F, provided that the discharge does not have a reasonable potential to exceed temperature water quality standards in waters of the state downstream of the discharge location.

(e) Discharges shall not contain wastewater from industrial or commercial processes, other than those authorized in sub. (1).

(f) Discharge does not contain a water treatment additive applied by the permittee, unless approved in writing by the department.

(g) Discharge does not cause a safety hazard due to unsafe ice conditions in winter.

(f) The permittee shall be required to collect representative daily maximum effluent temperatures not less than once per month. Unless specified otherwise by the department when coverage is granted under the general permit, the permittee shall not be required to submit effluent temperature data collected under the monitoring provisions of the general permit issued under this section. Any effluent temperature data collected shall be retained by the permittee for the duration of the permit or 3 years after this information is collected, whichever is longer and shall be provided to the department upon request.

(2) A general permit issued under this section may include any of the following conditions:

(a) Coverage under the general permit for discharges containing water treatment additives, including biocides, provided all other requirements of this chapter are met.

(b) Provisions that account for the heat loss that occurs in a discharge to a storm sewer or other storm water conveyance channel assuming the heat loss occurs at a rate of 0.25 degree F per 100 feet of storm sewer or channel length. The effluent temperature limitations determined under this paragraph shall be established when the department grants coverage under this general permit.

(c) Provisions to allow the department to establish more stringent effluent temperature limitations as necessary to attain or maintain water quality standards in downstream or other adjacent waters. The effluent temperature limitations determined under this paragraph shall be established when the department grants coverage under the general permit.

(3) A permittee granted coverage under the general permit authorized under this section shall be required to verify conformance with the conditions in sub. (1) whenever the permit coverage is renewed.

NR 106.62 Compliance schedules. Compliance with the effluent limitations shall be attained as soon as reasonably possible, but no later than the expiration date of the permit. When a permit is issued or reissued with effluent temperature limitations established using the procedures in this subchapter and representative effluent temperature data are available at the time of permit issuance or reissuance, the permit may contain a compliance schedule when either of the following conditions is met:

(1) The permittee does not apply for an alternative effluent limitation under the provisions of subch. VI.

(2) The permittee applies for an alternative effluent limitation under the provisions of subch. VI and, after reviewing the data and information provided with the application, the department determines that sufficient information to establish alternative effluent limitations for temperature is not available.

SECTION 27. Chapter 106, Subch, VI is created to read:

Subchapter VI – Alternative Effluent Limitations For Temperature

NR 106.70 Purpose. The purpose of this subchapter is to establish procedures for the determination by the department of alternative effluent limitations for temperature as authorized under s. 283.17, Stats. An alternative effluent limitation for temperature may be established by the department if the owner or operator of a point source demonstrates to the department that a proposed effluent limitation established under subch. V is more stringent than necessary to assure the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is made.

NR 106.71 Definitions. The definitions in ss. NR 205.03 and NR 205.04 apply to the terms used in this subchapter. In addition, the following definitions apply to the terms used in this subchapter:

(1) “Alternative effluent limitations for temperature” means effluent temperature limitations for the control of the thermal component of a discharge which are less restrictive than limitations calculated using the procedures specified in subch. V.

(2) “Balanced, indigenous community” or “balanced, indigenous population” means a biotic community typically characterized by diversity, the capacity to sustain itself through cyclic seasonal changes, presence of necessary food chain species, and non–domination of pollution tolerant species. Such a community may include historically non–native species introduced in connection with a program of wildlife management and species whose presence or abundance results from substantial, irreversible environmental modifications. Normally, however, the community may not include species whose presence or abundance is attributable to the introduction of pollutants that will be eliminated by compliance by all sources with effluent limitations and standards effective by July 1, 1983, including modifications thereof in accordance with the provisions of this subchapter; and may not include species whose presence or abundance is attributable to alternative effluent limitations imposed pursuant to this subchapter.

(3) “Existing discharge” means a discharge that is not a new POTW discharge.

(4) “New discharge” means a discharge that is issued a WPDES permit on or after the effective date of this subchapter, ...[revisor insert date].

(5) “Relevant evidence” means new or historical biological data, physical monitoring data and engineering or diffusion models.

(6) “Representative, important species” means species which are representative, in terms of their biological needs, of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water receiving a thermal discharge.

(7) “Water quality standards” means applicable water quality standards set forth in chs. NR 102–104, or any federally promulgated water quality standards applicable to surface waters of the state.

NR 106.72 Application for alternative effluent limitations for temperature. An application for an alternative effluent limitation may be submitted to the department by an owner or operator of a point source subject to effluent limitations determined under subch. V.

(1) **TIMING.** The application may be submitted at the time the owner or operator submits an application for issuance or reissuance of a WPDES permit or at any time following the issuance of a permit, subject to the permit modification provisions in s. 283.53, Stats.

(2) **NEW DISCHARGE.** A permittee may submit an application for alternative effluent limitations for temperature for a new discharge. The application shall include a demonstration that the effluent temperature limitations calculated according to the procedures specified in subch. V are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration shall examine the interaction of the thermal component with other pollutants and the additive effect of other thermal sources. The application shall also contain all of the following:

- (a) A description of the alternative effluent limitations for temperature requested.
- (b) A description of the methodology the applicant used to support the demonstration.
- (c) Biological, hydrological and meteorological data, physical monitoring data, engineering or diffusion models, laboratory studies and other relevant evidence.
- (d) The data and results of studies, experiments and other information that support the demonstration that the identified representative, important species will be protected, and that will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and aquatic life in and on the body of the water into which the discharge will be made.

(3) **EXISTING DISCHARGE.** An existing permittee may submit an application for alternative effluent limitations for temperature for an existing discharge. The application shall include a demonstration that the effluent temperature limitations calculated according to the procedures specified in subch. V are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration shall examine the interaction of the thermal component with other pollutants and the additive effect of other thermal sources. The permittee may request alternative effluent limitations for temperature under either par. (a) or (b).

(a) A permittee may demonstrate that no appreciable harm has resulted from the normal component of the discharge to a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge has been made. In determining whether or not prior appreciable harm has occurred, the department shall consider the length of time in which the applicant has been discharging and the nature of the discharge.

(b) A permittee may demonstrate that, despite the occurrence of previous appreciable harm, alternative effluent limitations for temperature will assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge has been made.

(c) In the application under this section, the permittee shall provide all of the following:

1. A description of the alternative effluent limitations for temperature requested.
2. A description of the methodology the applicant used to support the demonstration.
3. Biological, hydrological and meteorological data, physical monitoring data, engineering or diffusion models and laboratory studies and other relevant evidence.
4. The data and results of studies, experiments and other information that support the demonstration that the identified representative, important species will be protected, and that will assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and aquatic life in and on the water to which the discharge has been made.

NR 106.73 Identification of representative, important species. Any applicant for an alternative effluent limitation for temperature shall submit to the department a proposed list of representative important species prior to submitting an application and undertaking a demonstration under s. NR 106.72. The list shall take into account applicable water quality standards. The department may approve, disapprove or approve with modifications the proposed list of representative important species as the department deems appropriate.

NR 106.74 Determination of alternative effluent limitations for temperature. (1) NEW DISCHARGES. Alternative effluent limitations for temperature may be established by the department for a new discharge if the permittee demonstrates that the discharge, considering the cumulative impact of the thermal discharge together with all other significant impacts on the species affected will assure the protection and propagation of representative, important species and will, in turn, assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and aquatic life in and on the body of receiving water.

(2) EXISTING DISCHARGES. Alternative effluent limitations for temperature may be established by the department for an existing discharge if the permittee has demonstrated either of the following:

(a) No appreciable harm has resulted from the thermal component of the discharge, taking into account the interaction of the component with other pollutants and the additive effect of other thermal discharges, to the representative, important species and a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water receiving the discharge.

(b) That despite the occurrence of previous appreciable harm, alternative effluent limitations for temperature will assure the protection and propagation of the representative, important species and a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into receiving the discharge, taking into account the interaction of the thermal component with other pollutants and the additive effect of other thermal discharges.

(3) APPRECIABLE HARM. In determining whether appreciable harm has occurred the department shall consider any relevant biological, engineering or other data demonstrating that effluent limitations for temperature calculated using the procedures specified in subch. V are more stringent than necessary to

assure the protection and propagation of a balanced, indigenous community of shellfish, fish, and wildlife in and on the body of water receiving the discharge.

(4) **EXISTING VARIANCE WATER LIMITATIONS.** Alternative effluent limitations for temperature determined under this subchapter shall supersede any temperature limitations listed in par. NR 104.06(2)(b).

(5) **ZEBRA MUSSEL CONTROL.** Alternative effluent limitations for temperature determined under this subchapter shall be met, except for short-term excursions for zebra or other mussel control, as approved by the department and authorized in a permit on a case-by-case basis.

NR 106.75 Compliance schedules. Whenever the department issues or modifies a permit with alternative effluent limitations for temperature established using the procedures in this subchapter, the permit may contain a compliance schedule to attain such limitations. Compliance with the limitations shall be attained as soon as reasonably possible, but no later than the expiration date of the permit.

NR 106.76 Public notice. The public notice of intent to issue, reissue, or modify a permit with alternative effluent limitations established under this subchapter shall contain all of the following:

(1) The effluent temperature limitations that are calculated using the procedures specified in subch. V.

(2) The proposed alternative effluent limitations for temperature.

(3) A statement that the applicant has submitted a demonstration in support of a request for alternative effluent limitations for temperature and that the department is proposing to establish such alternative effluent limitations for temperature or, in the event that at the time of permit issuance, reissuance or modification there is insufficient information to support alternative effluent limitations for temperature, that the department is proposing to include a compliance schedule in the permit.

(4) A statement that all data submitted by the applicant and a summary of the data are available at the offices of the department for public inspection during office hours.

(5) A statement that any interested person may comment upon the applicant's proposed alternative effluent limitations for temperature.

NR 106.77 Application of the variance process in § 283.15, Stats. Whenever a permittee has been granted alternative effluent limitations for temperature under this chapter, the procedures of s. 283.15, Stats., are not applicable.

SECTION 28. Chapter NR 209 is repealed.

SECTION 29. EFFECTIVE DATE. The rule shall take effect the first day of the month following publication in the Wisconsin administrative register as provided in s. 227.22(2)(intro.), Stats.

SECTION 30. BOARD ADOPTION. The rule was approved and adopted by the State of Wisconsin
Natural Resources Board on _____.

Dated at Madison, Wisconsin _____

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

By _____
Matthew J. Frank, Secretary

(SEAL)