Document: IC 13-14-9 Notice, **Register Page Number:** 27 IR 1314
Source: January 1, 2004, Indiana Register, Volume 27, Number 4
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TITLE 327 WATER POLLUTION CONTROL BOARD

SECOND NOTICE OF COMMENT PERIOD
#03-129(WPCB)

DEVELOPMENT OF AMENDMENTS TO RULES CONCERNING WATER QUALITY ISSUES SUITABLE FOR FAST TRACK RULEMAKING

PURPOSE OF NOTICE

The Indiana Department of Environmental Management (IDEM) has developed draft rule language for amendments to rules in Title 327 concerning water quality standards, methods, and implementation procedures. By this notice, IDEM is soliciting public comment on the draft rule language. IDEM seeks comment on the affected citations listed and any other provisions of Title 327 that may be affected by this rulemaking.

HISTORY

First Notice of Comment Period: #03-129(WPCB) June 1, 2003, Indiana Register (26 IR 3166).

CITATIONS AFFECTED: 327 IAC 1; 327 IAC 2-1; 327 IAC 2-1.5; 327 IAC 2-4; 327 IAC 5-1.5; 327 IAC 5-2.

AUTHORITY: IC 13-13-5-1; 13-13-5-2; IC 13-14-8; 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3-1; IC 13-18-3-2; IC 13-18-3-3; IC 13-18-4-3.

SUBJECT MATTER AND BASIC PURPOSE OF RULEMAKING

Basic Purpose and Background

Under 40 CFR 131.20, states with approved NPDES programs are required to review their water quality standards at least once every three (3) years. Through the triennial review process, IDEM separated the many water quality issues into several rulemakings including this one for "fast track" issues. Issues that would have a reasonable potential to move through the rulemaking process more quickly due to the relative lack of controversy about the content or approach are included in this "fast track" rulemaking. The Triennial Review steering committee, a large and diverse group of interested stakeholders, helped identify needed rule changes based on best science, updates of existing rules, and technical corrections and clarifications that have a reasonable potential of minimal controversy.

IC 13-14-9-4 Identification of Restrictions and Requirements Not Imposed Under Federal Law

This statute requires IDEM to identify, as part of the second notice published in the Indiana Register, the estimated fiscal impact and expected benefits of any elements of the draft rule that are not imposed under federal law. IDEM seeks comments on these elements as well as specific fiscal impact information. The following elements of the draft rule are "not imposed under federal law" (NIFL elements) and have been identified as either having an estimated fiscal impact or providing an expected benefit to entities regulated under the draft rule. Review is required under federal law of specific, state-promulgated water quality standards that do not have a specific counterpart in federal regulation. Much of the federal information on suggested or preferred approaches is provided in the form of guidance and is not, therefore, specifically imposed under federal law.

A. 327 IAC 2-1-8.9: Site-specific criteria. This is a new section added to the non-Great Lakes system rules to allow for calculating site-specific aquatic life and human health criteria as is allowed in the Great Lakes system rules at 327 IAC 2-1.5-16.

EPA's Great Lakes Guidance contains a procedure that allows for the calculation of site-specific aquatic life and human health criteria that can be more or less stringent than EPA's recommended criteria. The addition of this section to the non-Great Lakes system area of Indiana will allow for these procedures to be available statewide. IDEM believes it is important to be able to calculate criteria that are more stringent than the criteria listed in Tables 6-1 and 6-2 when site-specific conditions warrant. Conversely, IDEM believes that it is important for the regulated entities to have the option to have IDEM calculate criteria that are less stringent when site-specific conditions warrant.

The fiscal impact and benefits on a regulated entity depend on whether site-specific criteria become more or less stringent than the criteria listed in Tables 6-1 and 6-2. If the site-specific criteria are less stringent, the fiscal impact on the regulated entity would be positive. More stringent criteria would have a negative fiscal impact on regulated entities. Data on specific costs are not available

because the calculation is a site-specific one.

B. 327 IAC 2-1-9(5):BCCs. The list of bioaccumulative chemicals of concern or BCCs has been added to this subdivision to match the definition of BCCs in 327 IAC 2-1.5-6 for the Great Lakes system. The list of BCCs is taken from EPA's Great Lakes Guidance.

Since 1990, 327 IAC 2 identified a list of chemicals in Table 6-1 as being BCCs because IDEM believed that these chemicals warranted special regulatory consideration. The change that is being made by this rulemaking is to make the list of BCCs in the area of the state outside of the Great Lakes system equivalent to the list inside the Great Lakes system.

This is a technical correction in the rules and has no fiscal impact.

C. 327 IAC 5-2-11.5(b)(1)(D): Reasonable potential to exceed. While the "reasonable potential to exceed" procedure is required under federal law, this specific provision is not; therefore, it is included in this section. Rule language has been added to the "reasonable potential to exceed" procedure concerning Great Lakes system dischargers that will allow a discharger to present dissolved metals effluent data for use in this procedure.

The regulation of dissolved metal rather than total metal is the U.S. EPA recommended approach for protection of aquatic life in the water column from adverse effects due to metal discharges. This rule language will only apply to the implementation of aquatic life criteria and not have any impact on human health protection.

This change provides an option to the reasonable potential procedure without incurring a fiscal impact on the regulated entities.

D. 327 IAC 5-2-11.1(b): Alternate stream flows. While the development of water quality-based effluent limitations, if necessary, is required under federal law, this specific provision is not; therefore, it is included in this section. Rule language has been added at subdivisions (7) and (8) to allow non-Great Lakes system intermittent or controlled discharges to use alternate stream flows to determine the mixing zone dilution.

The changes add options to the procedure used by IDEM to calculate water quality-based effluent limitations and will allow equivalent protection to human health and the environment as currently exists in IDEM rules.

This rule change is not expected to have a fiscal impact on the regulated entities.

Potential Fiscal Impact

IDEM believes the rule changes included in the "fast track" rulemaking will represent a net cost benefit to the regulated entities. At a minimum, some of the rulemaking changes provide options beyond what currently exists in rule; the impact to a regulated entity would, therefore, be nonexistent if the options were not employed.

IDEM requests public comment on the development, if necessary, of the estimate of economic impact and benefit from this rule.

Public Participation and Work Group Information

An external work group has been established to discuss issues involved in this rulemaking. The work group is made up of IDEM staff and a cross-section of stakeholders and began meeting in December 2002 to discuss and select the issues, originally identified by the Triennial Review steering committee, that would be appropriate candidates for the fast track rulemaking approach. The work group narrowed the issues to those in 327 IAC 1, 327 IAC 2-1, 327 IAC 2-1.5, 327 IAC 2-4, 327 IAC 5-1.5, and 327 IAC 5-2 (rules within Articles 1, 2, and 5). The issues selected include: dissolved metals for aquatic life criteria, free cyanide aquatic life criteria, sulfate and fluoride criteria, general narrative criteria, narrative criteria for whole effluent toxicity, site-specific modifications, Article 5 implementation procedures, and bioaccumulative chemicals of concern (BCCs).

Regarding the sulfate criterion, IDEM is specifically looking for comments on the proposed 1,000 mg/l criterion to be applied outside of the mixing zone. IDEM is in agreement that the existing criterion of 250 mg/l should be applied at drinking water intakes only. However, IDEM believes that available information supports the establishment of alternative criteria for waters to protect human health, aquatic life, or wildlife. This second notice proposes a 1,000 mg/l criterion as an interim number. IDEM has received comment that the 1,000 mg/l may be overly conservative and that an alternative number of 2,000 mg/l or higher may prove more appropriate. During the early part of 2004, IDEM will work with all parties and with those in other states and U.S. EPA that are conducting technical work that may prove valuable in providing input as to an appropriate number to present in the public hearing for preliminary adoption later in 2004. IDEM is receptive to altering the second notice "interim" sulfate criterion based on comments to this second notice and technical information that becomes available in 2004.

Information concerning the fast track work group activities may be found on the IDEM Triennial Rulemaking web page at: http://www.IN.gov/idem/water/planbr/wqs/review/fasttrk.html

If you wish to provide comments to the work group on the rulemaking, attend meetings, or have suggestions related to the work group process, please contact MaryAnn Stevens, Rules Section, Office of Water Quality at (317) 232-8635 or (800) 451-6027 (in Indiana). Please provide your name, phone number, and e-mail address, if applicable, where you can be contacted. The public is also encouraged to submit comments and questions to members of the work group who represent their particular interests in the rulemaking.

SUMMARY/RESPONSE TO COMMENTS FROM THE FIRST COMMENT PERIOD

IDEM requested public comment from June 1, 2003, through July 30, 2003, on alternative ways to achieve the purpose of the rule and suggestions for the development of draft rule language. IDEM received comment letters from the following parties by the comment period deadline:

Citizens Gas and Coke Utility, Wade Kohlmann, Director of Environmental Affairs (CG)

Indiana Water Quality Coalition and the Indiana Manufacturers Association, represented by Barnes and Thornburg (IWQC-IMA)

Indianapolis, City of, Barbara A. Lawrence, Director of Department of Public Works (INDP)

Industrial Discharge Advisory Committee, Vince Parker, Chairman (IDAC)

PSEG Services Corporation, Russell J. Furnari, Environmental Policy Manager (PSEG)

Following is a summary of the comments received and IDEM's responses thereto:

Comment: IDEM should revise the surface water cyanide water quality criteria from total cyanide to free cyanide. The toxicity tests performed to establish the cyanide criteria were performed on free cyanide; therefore, the standard in the receiving water should also be free cyanide. Cyanide that is chemically bonded as a metal complex has negligible toxicity. The water quality criteria in the Great Lakes basin is now free cyanide since the rule change of 1997. Similar rule change needs to be made for all waters in Indiana. (CG, IDAC, INDP)

Response: IDEM has drafted rule language to replace the total cyanide aquatic life criteria for the non-Great Lakes system with free cyanide aquatic life criteria.

Comment: No numeric value for a criterion is sufficient without designation of the intended methodology. The rule should allow the use of any EPA approved technique for free cyanide. These approved methods of measurement would include the longstanding cyanide amenable to chlorination (CATC) procedure and would also include the available cyanide test procedure that EPA has recently approved for use as an alternative to the amenable cyanide test procedure. (CG, IDAC)

Response: Title 40 CFR 136 contains analytical methods that are approved by EPA for the analysis of wastewater. There are currently no approved methods for free cyanide under 40 CFR 136, but there are two approved methods for available cyanide. These are the "Available Cyanide by Flow Injection with Ligand Exchange" method (Method OIA-1677) and the "Cyanides Amenable to Chlorination" (CATC) method (Method 4500-CN G). IDEM intends to allow the use of methods approved under 40 CFR 136 for available cyanide to monitor for compliance with an effluent limitation based on a criterion for free cyanide. However, U.S. EPA is currently reconsidering the use of Method 1677 for the measurement of available cyanide. Therefore, IDEM has not included this method in the draft rule but has made allowance for other methods approved by the commissioner. IDEM will make a determination on whether to allow the use of Method 1677 after U.S. EPA has completed its review.

Comment: Methods for monitoring effluent with a limit derived from the free cyanide criteria should include the CATC and Weak and Dissociable (WAD) methods though IDEM should provide additional language in the rule to allow for use of an analytical method for free cyanide when such a method is approved by EPA. The methods that seem likely to be approved by EPA are the American Standard Test Method (ASTM) D 4282-89, "Standard Test Method for Determination of Free Cyanide in Water and Wastewater by Microdiffusion" and the WERF Ion Chromatography Method for Cyanide Species. (INDP)

Response: Since U.S. EPA has not approved a method for free cyanide under 40 CFR 136, IDEM has not determined whether it will approve such a method. By allowing for other methods approved by the commissioner, IDEM could allow the use of such a method if the commissioner determines that it is appropriate.

Comment: The aquatic life criteria for the non-Great Lakes system rules should be changed from acid soluble to dissolved metals. However, deleting 327 IAC 2-1-6(a)(3) without providing new language does not appear to be consistent with the requirement to solicit public comment on new or proposed rules. (PSEG)

Response: IDEM proposes to remove from Table 6-1 the metals criteria that are expressed as acid soluble and move them to a new table identified as 6-2 and express the metals as dissolved.

Comment: No alternate tables have been provided for public comment on modifying Tables 1 and 2 in 327 IAC 2-1-6. Table 8-1 (in 327 IAC 2-1.5-8) and its associated conversion factors (excluding cadmium) might be an appropriate starting point for revising the metals component of Table 1. (PSEG)

Response: The new table, Table 6-2, contains the associated conversion factors from Table 8-1 with the exception of cadmium.

Comment: Methodologies for developing site-specific aquatic life, human health, and wildlife criteria for the non-Great Lakes system need to be proposed in a subsequent rulemaking. (PSEG)

Response: IDEM has drafted a new section (327 IAC 2-1-8.9) for the non-Great Lakes system rules that gives the same general information for conducting site-specific modifications to criteria as contained in the site-specific modification section for the Great Lakes system under 327 IAC 2-1.5-16. However, IDEM is currently discussing the approval process for site-specific modifications to criteria with U.S. EPA Region 5 and could not reach a conclusion by the deadline for the submission of the draft rule. Therefore, IDEM inserted a placeholder in the rules to inform interested parties that IDEM intends to draft rule language concerning the approval process prior to preliminary adoption. To expedite the approval process, IDEM may draft a detailed methodology for developing site-specific modifications using the recalculation procedure if U.S. EPA will approve such a methodology.

Comment: IDEM's proposal to revise the water quality rules so that dissolved metal translators (DMTs) must be immediately applied to dissolved criterion to calculate a total recoverable metal criterion is not accurately justified by the EPA guidance document, "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion," EPA 823-B-96-007 (June 1996), as IDEM cites in the first notice. EPA cannot impose binding requirements in guidance documents, and, secondly, the EPA guidance document does not specify that a DMT must be applied to a dissolved metal criterion before the wasteload allocation and reasonable potential procedures are conducted. Appendix A from the cited EPA guidance document (specifically Section A.5, pages 32 and 33) appears to promote the application of DMTs directly to water quality criteria. However, this appendix is no more than one example of how to derive permit limits for metal and has intentionally been made simplistic. More importantly, this appendix contradicts other statements in the main body of the guidance. There is good cause to apply the DMT after the wasteload allocation and reasonable potential processes are completed. The reasonable potential procedure for the Great Lakes system, specified at 327 IAC 5-2-11.5, requires calculating the preliminary effluent limitation ("PEL") and comparing the PEL to the projected effluent quality ("PEQ"). The procedure requires calculation of the PEL and PEQ followed by comparison of the PEL to the PEQ. The PEL is based on the water quality criteria, which are expressed as dissolved for metals. If the dissolved metal criteria are converted to total prior to undertaking this procedure, there would have been no reason to promulgate water quality criteria for metals as dissolved. (IWQC-IMA)

Response: IDEM has drafted rule language to apply the dissolved metals translator to the dissolved metals criterion in the calculation of wasteload allocations for water quality criteria expressed in the form of dissolved metal. The dissolved metals translator accounts for the fate of the metal in the receiving waterbody outside of the mixing zone and must be incorporated in the wasteload allocation equation to do the mass balance appropriately because nontoxic metal attributable to the discharge or receiving waterbody may become toxic after the discharge mixes with the receiving waterbody. The language in the draft rule is consistent with the wasteload allocation procedure in the U.S. EPA guidance document, "The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion," EPA 823-B-96-007, June 1996, Appendix A. The comment states that Appendix A contradicts other statements made in the main body of the guidance document. IDEM contacted the U.S. EPA staff person who is one of the principle authors of the guidance document about the apparent contradictions. The author stated that the apparent contradictions are only a matter of semantics and stood by the procedure in Appendix A as being necessary to do the mass balance correctly. The change to the procedure for calculating wasteload allocations does not impact the reasonable potential procedure since this procedure requires the PEL to be developed in accordance with the procedure for converting wasteload allocations into WQBELs in 327 IAC 5-2-11.6. Using the existing procedure in 327 IAC 5-2-11.6, PELs would be developed in the form of total recoverable metal. Using the revised procedure in the draft rule, PELs would continue to be developed in the form of total recoverable metal. IDEM disagrees with the statement that if dissolved metal criteria are converted to total prior to undertaking the reasonable potential procedure, there would have been no reason to promulgate water quality criteria for metals as dissolved. The dissolved metal criteria are not converted to a total recoverable criterion but to the total recoverable metal concentration outside the mixing zone that equates to the dissolved criterion. This allows the fate of the metal outside of the mixing zone to be appropriately addressed. Conducting reasonable potential using effluent data collected in the form of dissolved metal would not appropriately address the fate of the metal in the discharge outside of the mixing zone. Promulgating water quality criteria in the form of dissolved metal allows the use of a site-specific study to determine the fate of the metal outside of the mixing zone. Such a study could result in an increase in a wasteload allocation based on total recoverable metal.

Comment: The following provision should be added to 327 IAC 5-2-11.5(b)(1)(A) to clarify that IDEM must use dissolved metals data when available:

> "(v) If dissolved metals effluent data are available, the commissioner shall develop a dissolved metals PEL consistent with WLAs developed under items (i) through (iii). If this process determines that a substance is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion of the applicable criteria, the preliminary dissolved metal WLA will be converted into a total metal WQBEL using the statistical procedures in section 11.6 of this rule."

When the non-Great Lakes system metals criteria are revised to the dissolved form, this reasonable potential provision should be applied when IDEM issues permits for non-Great Lakes system dischargers. (IWQC-IMA)

Response: IDEM also asked the author of the Metals Translator guidance document mentioned in the preceding response about conducting reasonable potential using effluent data collected in the form of dissolved metal. The author referenced the Executive Summary in the Metals Translator guidance document in stating that reasonable potential should be done using effluent data collected in the form of total recoverable metal. The U.S. EPA document "Water Quality Guidance for the Great Lakes system: Supplementary Information Document (SID)," EPA-820-B-95-001, March 1995, includes an analysis of issues raised in comments received on the proposed Guidance. U.S. EPA explains, in Section VIII.E.2.b.i., that the proposed Guidance provided that preliminary effluent limitations be expressed as a single day value, a weekly average, or a monthly average and compared to actual effluent information. The document explains that since the preliminary effluent limitations must be compared to actual effluent information, the proposed Guidance provided that preliminary effluent limitations be expressed in the same form (i.e., single day,

weekly average, or monthly average) as effluent data are typically available to the permitting authority. This would allow for direct comparison of preliminary effluent limitations to effluent data without requiring additional manipulations or conversion of the effluent data. The document lists the permit application and discharge monitoring reports (DMRs) as the typical sources of data. Since effluent data for metals are typically reported in these sources as total recoverable metal, it is apparent from this explanation that the discussion of preliminary effluent limitations in Section VIII.E.2.b. is in the context of using total recoverable metal even though it is not explicitly stated. Therefore, based on the discussion in Section VIII.E.2.b., it appears that U.S. EPA intended the reasonable potential procedure to be done using effluent data collected in the form of total recoverable metal. IDEM is not aware of any U.S. EPA regulation, policy, or guidance document that allows or even mentions the use of effluent data collected in the form of dissolved metal in the determination of reasonable potential. However, IDEM does agree that there are some situations where it may be appropriate to conduct the reasonable potential procedure using PEQs developed using effluent data collected in the form of dissolved metal and PELs developed in the form of dissolved metal. IDEM has drafted rule language that specifies the conditions under which the reasonable potential procedure may be conducted in this manner. One condition is that the discharger must demonstrate that the metal in the effluent does not become more dissolved outside of the mixing zone. The rules for the non-Great Lakes system do not include detailed procedures for doing reasonable potential calculations. Therefore, IDEM does not believe it is appropriate to include such a provision in the rules for the non-Great Lakes system.

Comment: The new definition of bioaccumulative chemicals of concern (BCC) and the associated list of chemicals should follow IDEM's intent as stated in the first notice. (PSEG)

Response: Subsequent to the publication of the first notice, IDEM, through the workgroup process, has drafted rule language that only incorporates the Great Lakes system list of BCCs into the rules for the non-Great Lakes system. In order to incorporate the Great Lakes system definition of a BCC, a methodology for determining bioaccumulation factors (BAFs) would have to be incorporated into the rules for the non-Great Lakes system. IDEM does not believe that incorporating such a methodology is appropriate for this fast track rulemaking. The list of BCCs was incorporated by including only the list of BCCs in the definition of a BCC at 327 IAC 2-1-9. The substances in 327 IAC 2-1-6, Table 6-1 that are included in the list of BCCs are noted in the table as being BCCs.

Comment: The definition of outstanding national resource water (ONRW) should match the definition at IC 13-11-2-149.5. (IWQC-IMA, PSEG)

Response: Subsequent to the publication of the first notice, IDEM, through the workgroup process, has drafted rule language for ONRW that matches the definition at IC 13-11-2-149.5.

Comment: The definition of outstanding state resource water (OSRW) should match the definition at IC 13-11-2-149.6. (IWQC-IMA, PSEG)

Response: Subsequent to the publication of the first notice, IDEM, through the workgroup process, has drafted rule language for OSRW that matches the definition at IC 13-11-2-149.6.

Comment: Justification has not been provided for adopting narrative criteria from the Great Lakes system rule at 327 IAC 2-1.5-8(b) into the non-Great Lakes system rules. The CMC and CCC values to protect aquatic life presented in Table 8-1 and the wildlife quality criteria for protection of wildlife presented in Table 8-4 may be appropriate for the Great Lakes system but there is no explanation why the identified species, herring gull and bald eagle, and resultant specific values are appropriate for the non-Great Lakes system. Directly adopting this portion of the rule into the non-Great Lakes system might impose a secondary maximum concentration (SMC) or a secondary continuous concentration (SCC) to protect aquatic life from acute or chronic effects that had not previously been a requirement for these waters. (PSEG)

Response: The intent of the proposal in the first notice was to express the narrative criteria for the non-Great Lakes system in the same format as the narrative criteria for the Great Lakes system and to adopt narrative criteria for whole effluent toxicity (WET) into the rules for the non-Great Lakes system. IDEM has drafted rule language that expresses the narrative criteria for the non-Great Lakes system in the same format as the narrative criteria for the Great Lakes system. IDEM has not included narrative criteria for WET in the draft rule language. IDEM believes that adopting narrative criteria for WET into the rules for the non-Great Lakes system is not appropriate for the fast track rulemaking.

Comment: The point of temperature measurement should be determined on a case by case basis and not proscribed in rule for every waterbody. The temperature provision of 327 IAC 2-1.5-8(c)(4)(D)(i) may be appropriate for a large lake such as Lake Michigan but likely inappropriate for shallow, intermittent streams and rivers. (PSEG)

Response: After considering the comments received, IDEM believes that including a provision in the rules concerning where to measure for compliance with temperature criteria is not appropriate for the fast track rulemaking.

Comment: Provisions that specify where to measure for compliance with the temperature criteria need to be included in the water quality rules. The following language regarding temperature measurement location is suggested: "The values in [insert appropriate rule citation] shall normally be applied in the first meter below the water surface, but where waters are less than two (2) meters deep, the values shall normally be applied at one-half (½) the depth of the surface water.". (IWQC-IMA)

Response: After considering the comments received, IDEM believes that including a provision in the rules concerning where to measure for compliance with temperature criteria is not appropriate for the fast track rulemaking.

Comment: The first notice for this fast track rulemaking did not address the applicability of 327 IAC 2-1 and 327 IAC 2-1.5, the water quality standards rules for waters outside and inside the Great Lakes system. These rules should both be clarified to specify that they apply to surface waters only. Separate water quality standards in 327 IAC 2-11 apply to ground water. (IWQC-IMA)

Response: IDEM agrees that addressing the applicability of 327 IAC 2-1 and 327 IAC 2-1.5 to all waters or all surface waters should be considered as part of the fast track rulemaking. IDEM has made revisions to several sections of 327 IAC 2-1 and 327 IAC 2-1.5, but was not able to complete a review of all the sections by the deadline for the submission of this draft rule. IDEM plans to address the other sections prior to preliminary adoption. As a part of this effort, IDEM has drafted rule language to revise the definition of surface waters of the state in 327 IAC 2-1-9 and 327 IAC 2-1.5-2.

Comment: The dissolved solids, sulfates, and fluoride criteria for waters outside of the Great Lakes system at 327 IAC 2-1-6(a)(3) should be revised to apply only to waters used for public water supply and industrial water supply such as is the appropriate criteria for dissolved solids, sulfates, and fluoride contained in 327 IAC 2-1-6(e) and 327 IAC 2-1-6(f), respectively. (IWQC-IMA)

Response: Subsequent to the publication of the first notice, IDEM, through the workgroup process, has drafted rule language to remove the criterion for dissolved solids from 327 IAC 2-1-6, Table 6-1 and place it in the public water supply criteria at 327 IAC 2-1-6(e). IDEM has also drafted rule language to add a criterion for dissolved solids to the public water supply criteria for the Great Lakes system at 327 IAC 2-1.5-8(f). A criterion for dissolved solids for waters used for industrial water supply is already in the rules for the Great Lakes system and non-Great Lakes system. IDEM has also drafted rule language to change the criterion for sulfates in Table 6-1 from 250 mg/l to 1000 mg/l and to apply it to all waters outside the applicable mixing zone. A criterion for sulfates is already included in the public water supply criteria at 327 IAC 2-1-6(e). The criterion of 1000 mg/l is being proposed as an interim number until sufficient toxicological data are available to develop appropriate aquatic life criteria. IDEM does not believe that removing the criteria for fluoride from Table 6-1 and adding them to the public water supply criteria at 327 IAC 2-1-6(e) is appropriate for the fast track rulemaking.

Comment: 327 IAC 2-1-6(b)(5) and 327 IAC 2-1.5-8(c)(5), ammonia criteria for non-Great Lakes system and Great Lakes system waters, need to be updated to be consistent with the 1999 EPA ammonia criteria guidance particularly concerning the relationship of pH and temperature to the acute and chronic criteria and the averaging period of the chronic criteria. The acute criterion is now dependent on pH and fish species, and the chronic criterion is based on pH and temperature. At lower temperatures, the chronic criterion is also dependent on early life stages of fish. As a result, when protection of the early life stages of fish is not needed, the chronic criterion values in the 1999 update are higher than the values in the 1984 guidance document. (IWQC-IMA)

Response: During the workgroup process to develop the first notice and choose the fast track issues to be addressed through this rulemaking, ammonia was not considered to be a fast track issue.

Comment: EPA's 1999 update of ammonia criteria also revised the averaging period and flow design recommendations for the chronic criterion so that stream design flow can be applied based on a thirty (30) day averaging period for ammonia. Alternately, the states may multiply by two and one-half (2.5) EPA's recommended stream design flow for four (4) day chronic criterion. Application of either the thirty (30) day averaging period or the four (4) day averaging period times two and one-half (2.5) will result in less restrictive criteria than the averaging period in the 1984 guidance document. (IWQC-IMA)

Response: During the workgroup process to develop the first notice and choose the fast track issues to be addressed through this rulemaking, ammonia was not considered to be a fast track issue.

Comment: The Method 4 application factor at 327 IAC 2-1-8.3(4) for Determination of Non-Great Lakes System Chronic Aquatic Life Criteria should be revised to 18 to be consistent with the Great Lakes system factor at 327 IAC 2-1.5-12(b). (IWQC-IMA)

Response: During the workgroup process to develop the first notice and choose the fast track issues to be addressed through this rulemaking, changing the Method 4 application factor was not considered to be a fast track issue.

REQUEST FOR PUBLIC COMMENTS

This notice requests the submission of comments on the draft rule language, including suggestions for specific revisions to language to be contained in the draft rule. Mailed comments should be addressed to:

#03-129(WPCB) [Fast Track Issues]
MaryAnn Stevens
Rules Section
Office of Water Quality
Indiana Department of Environmental Management
P.O. Box 6015
Indianapolis, Indiana 46206-6015.

Hand delivered comments will be accepted by the IDEM receptionist on duty at the twelfth floor reception desk, Office of Water

Quality, Indiana Government Center-North, Room 1255, 100 North Senate Avenue, Indianapolis, Indiana. Comments also may be submitted by facsimile to (317) 232-8406, Monday through Friday, between 8:15 a.m. and 4:45 p.m. Please confirm the timely receipt of faxed comments by calling the Office of Water Quality, Rules Section at (317) 233-8903. Please note it is not necessary to follow a faxed comment letter with another sent through the postal system.

COMMENT PERIOD DEADLINE

Comments must be postmarked, hand delivered, or faxed by January 30, 2004.

Additional information regarding this rulemaking action may be obtained from MaryAnn Stevens, Rules Section, Office of Water Quality, (317) 232-8635 or technical information concerning fast track may be obtained from John Elliott, Permits Branch, 317-233-0703 or David Kallander, Assessment Branch, 317-308-3088 or (800) 451-6027 (in Indiana).

DRAFT RULE

SECTION 1. 327 IAC 1-1-1 IS AMENDED TO READ AS FOLLOWS:

327 IAC 1-1-1 References to Federal Act
Authority: IC 13-14-9; IC 13-18-3-2
Affected: IC 13-14-8

Sec. 1. Unless otherwise indicated, references in ~~these rules (327 IAC)~~ **this title** to the Federal Water Pollution Control Act or to the Clean Water Act (CWA) shall mean the Federal Water Pollution Control Act ~~as defined~~ in ~~IC 13-7-1-10.~~ **effect July 1, 2003.** *(Water Pollution Control Board; 327 IAC 1-1-1; filed Sep 24, 1987, 3:00 p.m.: 11 IR 579; readopted filed Jan 10, 2001, 3:23 p.m.: 24 IR 1518)*

SECTION 2. 327 IAC 1-1-2 IS AMENDED TO READ AS FOLLOWS:

327 IAC 1-1-2 References to the Code of Federal Regulations
Authority: IC 13-14-9; IC 13-18-3-2
Affected: IC 13-14-8

Sec. 2. Unless otherwise indicated, any reference to a provision of the Code of Federal Regulations (CFR) shall mean the July 1, ~~1986~~ **2003,** revision. *(Water Pollution Control Board; 327 IAC 1-1-2; filed Sep 24, 1987, 3:00 p.m.: 11 IR 579; readopted filed Jan 10, 2001, 3:23 p.m.: 24 IR 1518)*

SECTION 3. 327 IAC 1-1-3 IS AMENDED TO READ AS FOLLOWS:

327 IAC 1-1-3 Severability
Authority: IC 13-14-9; IC 13-18-3-2
Affected: IC 13-14-8

Sec. 3. If any provision of ~~these rules (327 IAC)~~ **this title** or the application thereof to any person or circumstance is held invalid, the invalidity shall not affect any other provisions or applications of ~~these rules (327 IAC) which~~ **this title that** can be given effect without the invalid provision or application. *(Water Pollution Control Board; 327 IAC 1-1-3; filed Sep 24, 1987, 3:00 p.m.: 11 IR 579; readopted filed Jan 10, 2001, 3:23 p.m.: 24 IR 1518)*

SECTION 4. 327 IAC 2-1-5 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-5 Exception to quality standards applicability
Authority: IC 13-14-9; IC 13-18-3-2
Affected: IC 13-14-8

Sec. 5. All surface water quality standards in section 6 of this rule, except those provided in section 6(a)(1) of this rule, will cease to be applicable when the stream flows are less than the average minimum seven (7) consecutive day low flow ~~which~~ **that** occurs once in ten (10) years. This determination will be made using Low-Flow Characteristics of Indiana Streams, ~~1983,~~ **1996,** United

States Department of the Interior, Geological Survey, or any additional information compiled on a comparable basis. *(Water Pollution Control Board; 327 IAC 2-1-5; filed Sep 24, 1987, 3:00 p.m.: 11 IR 581; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1020)*

SECTION 5. 327 IAC 2-1-6 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-6 Minimum surface water quality standards
Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3
Affected: IC 13-18-4; IC 13-30-2-1; IC 14-22-9

Sec. 6. (a) The following are minimum **surface** water quality conditions:

(1) All **surface** waters at all times and at all places, including **waters within** the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges **that do any of the following:**

(A) ~~that~~ Will settle to form putrescent or otherwise objectionable deposits.

(B) ~~that~~ Are in amounts sufficient to be unsightly or deleterious.

(C) ~~that~~ Produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance. ~~which~~

(D) Are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such degree as to create a nuisance, be unsightly, or otherwise impair the designated uses.

~~(D)~~ **(E)** Are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill, aquatic life, other animals, plants, or humans:

(i) to assure protection of aquatic life, concentrations of toxic substances shall not exceed the final acute value (FAV = 2 (AAC)) in the undiluted discharge or the acute aquatic criterion (AAC) outside the zone of initial dilution or, if applicable, the zone of discharge-induced mixing:

(AA) for certain substances, the AAC are established and set forth in **subdivision (3),** Table ~~1~~ **6-1 and subdivision (3), Table 6-2,** (which table incorporates **subdivision (4),** Table ~~2);~~ ~~and~~ **6-3);**

(BB) for substances for which an AAC is not specified in **subdivision (3),** Table ~~1~~ ~~or~~ ~~if~~ ~~a~~ ~~different~~ ~~AAC~~ ~~can~~ ~~be~~ ~~scientifically~~ ~~justified~~ ~~based~~ ~~on~~ ~~new~~ ~~toxicological~~ ~~data~~ ~~or~~ ~~site-specific~~ ~~conditions~~ ~~concerning~~ ~~water~~ ~~quality~~ ~~characteristics~~ ~~or~~ ~~species~~ ~~present,~~ **6-1 or subdivision (3), Table 6-2,** an AAC can be calculated by the commissioner using the procedures in section 8.2 of this rule; and

(CC) the AAC determined under subitem (AA) or (BB) may be modified on a site-specific basis to reflect local conditions in accordance with section 8.9 of this rule; and

(ii) this clause shall not apply to the chemical control of plants and animals when that control is performed in compliance with approval conditions specified by the Indiana department of natural resources as provided by ~~IC~~ ~~14-2-1;~~ ~~and~~ **IC 14-22-9.**

~~(E)~~ ~~which~~ ~~are~~ ~~in~~ ~~concentrations~~ ~~or~~ ~~combinations~~ ~~that~~ ~~will~~ ~~cause~~ ~~or~~ ~~contribute~~ ~~to~~ ~~the~~ ~~growth~~ ~~of~~ ~~aquatic~~ ~~plants~~ ~~or~~ ~~algae~~ ~~to~~ ~~such~~ ~~degree~~ ~~as~~ ~~to~~ ~~create~~ ~~a~~ ~~nuisance,~~ ~~be~~ ~~unsightly,~~ ~~or~~ ~~otherwise~~ ~~impair~~ ~~the~~ ~~designated~~ ~~uses.~~

(2) At all times, all **surface** waters outside of mixing zones shall be free of substances in concentrations ~~which~~ **that** on the basis of available scientific data are believed to be sufficient to injure, be chronically toxic to, or be carcinogenic, mutagenic, or teratogenic to humans, animals, aquatic life, or plants. To assure protection against the adverse effects identified in this subdivision, the following requirements are established:

(A) A toxic substance or pollutant shall not be present in such waters in concentrations which exceed the most stringent of the following continuous criterion concentrations (CCCs):

(i) A chronic aquatic criterion (CAC) to protect aquatic life from chronic toxic effects.

(ii) A terrestrial life cycle safe concentration (TLSC) to protect terrestrial organisms from toxic effects ~~which~~ **that** may result from the consumption of aquatic organisms ~~and/or~~ **or** water from the waterbody.

(iii) A human life cycle safe concentration (HLSC) to protect human health from toxic effects ~~which~~ **that** may result from the consumption of aquatic organisms ~~and/or~~ **or** drinking water from the waterbody.

(iv) For carcinogenic substances, a criterion to protect human health from unacceptable cancer risk of greater than one (1) additional occurrence of cancer per one hundred thousand (100,000) population.

(B) For certain substances, one (1) or more of the CCCs identified in clause (A) are established and set forth in **subdivision (3),** Table ~~1~~ **6-1and subdivision (3), Table 6-2** (which table incorporates **subdivision (4),** Table ~~2).~~ ~~If~~ **6-3).**

(C) For substances for which one (1) or more of the CCCs **identified in clause (A)** are ~~absent~~ ~~from~~ **not specified in subdivision (3),** Table ~~1~~ ~~or~~ ~~if~~ ~~a~~ ~~different~~ ~~criterion~~ ~~or~~ ~~criteria~~ ~~can~~ ~~be~~ ~~scientifically~~ ~~justified~~ ~~based~~ ~~on~~ ~~new~~ ~~toxicological~~ ~~data~~ ~~or~~ ~~site-specific~~ ~~conditions~~ ~~of~~ ~~water~~ ~~quality~~ ~~or~~ ~~resident~~ ~~species,~~ **6-1 or subdivision (3), Table 6-2,** such criterion or criteria may be calculated by the commissioner using the corresponding procedures prescribed by sections 8.3 through 8.6 of this rule.

(D) A CCC determined under clause (B) or (C) may be modified on a site-specific basis to reflect local conditions in accordance with section 8.9 of this rule.

~~(C)~~ **(E)** The CAC and TLSC for a substance apply in all **surface** waters outside a mixing zone for a discharge of that substance. Similarly, in waters where a public ~~drinking~~ water **system** intake is not present or is unaffected by the discharge of a substance, the HLSC and the carcinogenic criterion for that substance based on consumption of organisms from the waterbody and only incidental ingestion of water shall apply to all **surface** waters outside the mixing zone for a discharge of that substance. In **surface** waters where a public ~~drinking~~ water **system** intake is present, the HLSC and the carcinogenic criterion for a substance based on consumption of organisms and potable water from the waterbody shall apply at the point of the public ~~drinking~~ water **system** intake.

~~(D) All CCCs shall be met at the point at which they apply (outside of the mixing zone or point of drinking water intake).~~

(3) ~~The toxicity criteria set forth for metals in Table 1 are expressed in terms of the acid-soluble fraction of the metals (unless specified otherwise) in order to be consistent with the ambient water quality criteria published by the U.S. Environmental Protection Agency (EPA) for these metals. In the absence of an analytical chemistry method approved by EPA for determination of the acid-soluble fraction of a metal, the criteria in Table 1 shall be enforced as total recoverable metals, except as otherwise provided in 327 IAC 5-2-11.1, until an acid-soluble analytical method is approved by EPA, and by the board through rulemaking.~~

The following establishes surface water quality criteria for specific substances:

Table ~~1~~ **6-1**

Surface Water Quality Criteria for Specific Substances

	AAC (Maximum)	CCC (4-Day Average)		
		Outside of Mixing Zone		Point of Water Intake
Substances		Aquatic Life (CAC)	Human Health	Human Health
Metals (µg/l)				
~~(Acid soluble, except as indicated)~~ **Total recoverable**				
Antimony			45,000 (T)	146 (T)
Arsenic (III)~~@~~	~~360~~ #	~~190~~ #	0.175 (C)	0.022 (C)
Barium				1,000 (D)
Beryllium			1.17 (C)	0.068 (C)
Cadmium ~~#@~~	$e^{(1.128\ [\ln Hard]-3.828)}$ #	$e^{(0.7852\ [\ln Hard]-3.490)}$ #		10 (D)
Chromium (III)~~#@~~	$e^{(0.819\ [\ln Hard]+3.688)}$ #	$e^{(0.8190\ [\ln Hard]+1.561)}$ #	3,433,000 (T)	170,000 (T)
Chromium (VI)~~@~~	~~(dissolved) 16~~ #	~~11~~ #		50 (D)
Copper ~~#~~	$e^{(0.9422\ [\ln Hard]-1.464)}$ #	$e^{(0.8545\ [\ln Hard]-1.465)}$ #		
Lead ~~#~~	$e^{(1.273\ [\ln Hard]-1.460)}$ #	$e^{(1.273\ [\ln Hard]-4.705)}$ #		50 (D)
Mercury ~~@~~$	2.4	0.012	0.15 (T)	0.14 (T)
Nickel ~~#~~	$e^{(0.8460\ [\ln Hard]+3.3612)}$ #	$e^{(0.8460\ [\ln Hard]+1.1645)}$ #	100 (T)	13.4 (T)
Selenium	130* ~~*~~	35		10 (D)
Silver ~~#~~	$e^{(1.72\ [\ln Hard]-6.52)}$~~/2**~~ #			50 (D)
Thallium			48 (T)	13 (T)
Zinc ~~#~~	$e^{(0.8473\ [\ln Hard]+0.8604)}$ #	$e^{(0.8473\ [\ln Hard]+0.7614)}$ #		
Organics (µg/l)				
Acrolein			780 (T)	320 (T)
Acrylonitrile			6.5 (C)	0.58 (C)
Aldrin ~~@~~$	1.5~~***~~		0.00079 (C)	0.00074 (C)
Benzene ~~@~~			400 (C)	6.6 (C)
Benzidine			0.0053 (C)	0.0012 (C)

Carbon Tetrachloride			69.4 (C)	4.0 (C)
Chlordane ☎$	1.2***	0.0043	0.0048 (C)	0.0046 (C)
Chlorinated Benzenes				
Monochlorobenzene ☎				488 (T)
1,2,4,5-Tetrachlorobenzene $			48 (T)	38 (T)
Pentachlorobenzene $			85 (T)	74 (T)
Hexachlorbenzene ☎$			0.0074 (C)	0.0072 (C)
Chlorinated Ethanes				
1,2-dichloroethane			2,430 (C)	9.4 (C)
1,1,1-trichloroethane ☎			1,030,000 (T)	18,400 (T)
1,1,2-trichloroethane ☎			418 (C)	6.0 (C)
1,1,2,2-tetrachloroethane☎			107 (C)	1.7 (C)
Hexachloroethane ☎$			87.4 (C)	19 (C)
Chlorinated Phenols				
2,4,5-trichlorophenol				2,600 (T)
2,4,6-trichlorophenol ☎			36 (C)	12 (C)
Chloroalkyl Ethers				
bis(2-chloroisopropyl) ether			4,360 (T)	34.7 (T)
bis(chloromethyl) ether			0.018 (C)	0.000038 (C)
bis(2-chloroethyl) ether			13.6 (C)	0.3 (C)
Chloroform			157 (C)	1.9 (C)
Chlorpyrifos $	0.083	0.041		
DDT ☎$	0.55***	0.0010	0.00024 (C)	0.00024 (C)
Dichlorobenzenes ☎			2,600 (T)	400 (T)
Dichlorobenzidine ☎			0.2 (C)	0.1 (C)
1,1-dichloroethylene			18.5 (C)	0.33 (C)
2,4-dichlorophenol ☎				3,090 (T)
Dichloropropenes			14,100 (T)	87 (T)
Dieldrin ☎$	1.3***	0.0019	0.00076 (C)	0.00071 (C)
2,4-dinitrotoluene ☎			91 (C)	1.1 (C)
Dioxin (2,3,7,8-TCDD) ☎$			0.0000001 (C)	0.0000001 (C)
1,2-diphenylhydrazine ☎			5.6 (C)	0.422 (C)
Endosulfan ☎	0.11***	0.056	159 (T)	74 (T)
Endrin ☎$	0.09***	0.0023		1.0 (D)
Ethylbenzene ☎			3,280 (T)	1,400 (T)
Fluoranthene ☎$			54 (T)	42 (T)
Halomethanes			157 (C)	1.9 (C)
Heptachlor ☎$	0.26***	0.0038	0.0028 (C)	0.0028 (C)
Hexachlorobutadiene ☎$			500 (C)	4.47 (C)
Hexachlorocyclohexane (HCH)				
alpha HCH ☎$			0.31 (C)	0.09 (C)
beta HCH ☎$			0.55 (C)	0.16 (C)
gamma HCH (Lindane) ☎$	1.0***	0.080	0.63 (C)	0.19 (C)
Technical HCH ☎$			0.41 (C)	0.12 (C)
Hexachlorocyclopentadiene ☎				206 (T)
Isophorone			520,000 (T)	5,200 (T)
Nitrobenzene				19,800 (T)
Nitrophenols				
4,6-dinitro-o-cresol			765 (T)	13.4 (T)
Dinitrophenol			14,300 (T)	70 (T)

Nitrosamines				
N-nitrosodiethylamine			12.4 (C)	0.008 (C)
N-nitrosodimethylamine			160 (C)	0.014 (C)
N-nitrosodibutylamine			5.9 (C)	0.064 (C)
N-nitrosodiphenylamine ~~@~~			161 (C)	49 (C)
N-nitrosopyrrolidine			919 (C)	0.16 (C)
Parathion ~~@~~	0.065	0.013		
Pentachlorophenol ~~@~~	$e^{(1.005\ [pH]-4.830)}$	$e^{(1.005\ [pH]-5.290)}$		1,000 (T)
Phenol ~~$~~				3,500 (T)
Phthalate Esters				
Dimethyl phthalate			2,900,000 (T)	313,000 (T)
Diethyl phthalate			1,800,000 (T)	350,000 (T)
Dibutyl phthalate ~~@$~~			154,000 (T)	34,000 (T)
Di-2-ethylhexyl phthalate ~~$~~			50,000 (T)	15,000 (T)
Polychlorinated Biphenyls (PCBs) ~~@~~$		0.014	0.00079 (C)	0.00079 (C)
Carcinogenic Polynuclear Aromatic Hydrocarbons (PAHs) ~~@$~~			0.31 (C)	0.028 (C)
Tetrachloroethylene ~~@~~			88.5 (C)	8 (C)
Toluene ~~@~~			424,000 (T)	14,300 (T)
Toxaphene ~~@~~$	0.73	0.0002	0.0073 (C)	0.0071 (C)
Trichloroethylene ~~@~~			807 (C)	27 (C)
Vinyl Chloride			5,246 (C)	20 (C)
Other Substances				
Asbestos (fibers/liter)				300,000 (C)
Chlorides (mg/l)	860	230		
Chlorine (Total Residual) (µg/l)	19	11		
Chlorine[a] (mg/l) (intermittent, total residual)		0.2		
Cyanide (Free) (µg/l)	**22**	**5.2**		
Cyanide (Total) (µg/l)	~~22~~	~~5.2~~		200 (D)
Nitrate-N + Nitrite-N (mg/l)				10 (D)
Nitrite-N (mg/l)				1.0 (D)

~~Dissolved solids shall not exceed 750 mg/l in all waters.~~

Fluoride shall not exceed 2.0 mg/l in all **surface** waters **outside the applicable mixing zone** except the Ohio River and Interstate Wabash River where it shall not exceed 1.0 mg/l **outside the applicable mixing zone.**

Sulfates shall not exceed ~~250~~ **1,000** mg/l in all **surface** waters **outside the applicable mixing zone.**

~~#See Table 2 for calculated~~ **The** AAC and CAC ~~values at various hardness levels. The criteria from Table 2 may be utilized in the alternative to criteria from Table 1 to determine protective concentrations for the seven (7) metallic substances for acute and chronic toxicity based on the characteristic hardness for a particular waterbody. For hardness values other than those specifically listed in Table 2, the standard proportional interpolation technique should be used to obtain the corresponding criteria values.~~ **for this substance are established in Table 6-2.**

~~*Natural logarithm of hardness in milligrams per liter $CaCO_3$.~~

~~**~~ *One-half (½) of the final acute value (FAV) as calculated by procedures developed by U.S. EPA in 1980. This value would correspond to acute aquatic values calculated using IDEM procedures or U.S. EPA procedures developed in 1985 in which the calculated FAV is divided by two (2) to reduce acute toxicity.

T derived from threshold toxicity.

C derived from nonthreshold cancer risk.

D derived from drinking water standards, equal to or less than threshold toxicity.

~~@This substance, which has a log octanol-water partition coefficient greater than or equal to two (2.0), is considered to be bioconcentrating and of concern.~~

$This substance is ~~considered to be~~ a bioaccumulative chemical of concern.

[a]To be considered an intermittent discharge, total residual chlorine shall not be detected in the discharge for a period of more than forty (40) minutes in duration and such periods shall be separated by at least five (5) hours.

Table 6-2

Surface Water Quality Criteria for Specific Substances

Substances	AAC (Maximum) (µg/l)	AAC Conversion Factors	CAC (4-Day Average) (µg/l)	CAC Conversion Factors
Metals (dissolved)[1]				
Arsenic (III)	**360**	**1.000**	**190**	**1.000**
Cadmium	$e^{(1.128\ [1n(hardness)]-3.828)}$	**1.136672-[(ln hardness)(0.041838)]**	$e^{(0.7852\ [1n(hardness)]-3.490)}$	**1.101672-[(ln hardness)(0.041838)]**
Chromium (III)	$e^{(0.819\ [1n(hardness)]+3.688)}$	**0.316**	$e^{(0.8190\ [1n(hardness)]+1.561)}$	**0.860**
Chromium (VI)	**16**	**0.982**	**11**	**0.962**
Copper	$e^{(0.9422\ [1n(hardness)]-1.464)}$	**0.960**	$e^{(0.8545\ [1n(hardness)]-1.465)}$	**0.960**
Lead	$e^{(1.273\ [1n(hardness)]-1.460)}$	**1.46203-[(ln hardness)(0.145712)]**	$e^{(1.273\ [1n(hardness)]-4.705)}$	**1.46203-[(ln hardness)(0.145712)]**
Nickel	$e^{(0.8460\ [1n(hardness)]+3.3612)}$	**0.998**	$e^{(0.8460\ [1n(hardness)]+1.1645)}$	**0.997**
Silver	$e^{(1.72\ [ln(hardness)]-6.52)}/2$[2]	**0.85**		
Zinc	$e^{(0.8473\ [ln(hardness)]+0.8604)}$	**0.978**	$e^{(0.8473\ [ln(hardness)]+0.7614)}$	**0.986**

[1] The AAC and CAC columns of this table contain total recoverable metals criteria (numeric **and hardness-based**). **The criterion for the dissolved metal is calculated by multiplying the appropriate conversion factor by the AAC or CAC**. **This dissolved AAC or CAC shall be rounded to two** (2) **significant digits**, **except when the criteria are used as intermediate values in** a **calculation**, **such as in the calculation of water quality-based effluent limitations (WQBELs).**

[2] One-half (½) of the final acute value (FAV) as calculated by procedures developed by U.S. EPA in 1980. This value would correspond to acute aquatic values calculated using IDEM procedures or U.S. EPA procedures developed in 1985 in which the calculated FAV is divided by two (2) to reduce acute toxicity.

(4) The following, Table 6-3, establishes dissolved acute (AAC) and chronic (CAC) aquatic criteria for certain metals at selected hardness values calculated from the equations and conversion factors in subdivision (3), Table 6-2:

Table ~~2~~ **6-3**

~~Acute (AAC) and chronic (CAC) aquatic criteria for certain metals at selected hardness values as calculated from equations in Table 1~~ Metals Concentrations in Micrograms Per Liter; Hardness in Milligrams Per Liter $CaCO_3$[1]

	Arsenic (III)		Cadmium		Chromium III		**Chromium VI**		Copper		Lead		Nickel		Silver		Zinc	
Hardness	**AAC**	**CAC**	AAC	CAC	AAC	CAC	**AAC**	**CAC**	AAC	CAC	AAC	CAC	AAC	CAC	AAC	CAC	AAC	CAC
50	**360**	**190**	~~2~~	~~0.7~~	~~984~~	~~117~~	**16**	**11**	~~9~~	~~6~~	~~34~~	~~1~~	~~789~~	~~88~~	~~0.6~~	–	~~65~~	~~59~~
			1.7	**0.62**	**310**	**100**			**8.9**	**6.3**	**30**	**1.2**	**790**	**87**	**0.52**		**64**	**58**
100	**360**	**190**	~~4~~	~~1.1~~	~~1737~~	~~207~~	**16**	**11**	~~18~~	~~12~~	~~82~~	~~3~~	~~1418~~	~~158~~	~~2~~	–	~~117~~	~~106~~
			3.7	**1.0**	**550**	**180**			**17**	**11**	**65**	**2.5**	**1400**	**160**	**1.7**		**110**	**100**
150	**360**	**190**	~~6~~	~~1.6~~	~~2420~~	~~289~~	**16**	**11**	~~26~~	~~17~~	~~137~~	~~5~~	~~1999~~	~~222~~	~~4~~	–	~~165~~	~~149~~
			5.7	**1.4**	**760**	**250**			**25**	**16**	**100**	**3.9**	**2000**	**220**	**3.5**		**160**	**150**
200	**360**	**190**	~~9~~	~~2.0~~	~~3064~~	~~365~~	**16**	**11**	~~34~~	21	~~197~~	~~8~~	~~2549~~	~~283~~	~~7~~	–	~~210~~	~~191~~
			7.8	**1.7**	**970**	**310**			**33**		**140**	**5.3**	**2500**	**280**	**5.7**		**210**	**190**
250	**360**	**190**	~~11~~	~~2.3~~	~~3679~~	~~438~~	**16**	**11**	~~42~~	~~26~~	~~262~~	~~10~~	~~3079~~	~~342~~	~~10~~	–	~~254~~	~~230~~
			10	**2.0**	**1200**	**380**			**40**	**25**	**170**	**6.7**	**3100**	**340**	**8.3**		**250**	**230**
300	**360**	**190**	~~14~~	~~2.7~~	~~4270~~	~~509~~	**16**	**11**	~~50~~	~~30~~	~~331~~	~~13~~	~~3592~~	~~400~~	~~13~~	–	~~297~~	~~269~~
			12	**2.3**	**1300**	**440**			**48**	**29**	**210**	**8.1**	**3600**	**400**	**11**		**290**	**270**
350	**360**	**190**	~~16~~	~~3.0~~	~~4845~~	~~577~~	**16**	**11**	~~58~~	~~34~~	~~402~~	~~16~~	~~4093~~	~~455~~	~~18~~	–	~~338~~	~~306~~
			14	**2.6**	**1500**	**500**			**55**	**33**	**240**	**9.5**	**4100**	**450**	**15**		**330**	**300**

400	**360**	**190**	~~19~~	~~3.4~~	~~5405~~	~~644~~	**16**	**11**	~~65~~	~~39~~	~~477~~	~~19~~	~~4582~~	~~509~~	~~22~~	–	~~379~~	~~343~~
			17	**2.9**	**1700**	**550**			**63**	**37**	**280**	**11**	**4600**	**510**	**19**		**370**	**340**
450	**360**	**190**	~~21~~	~~3.7~~	~~5952~~	~~709~~	**16**	**11**	~~73~~	~~43~~	~~554~~	~~22~~	~~5063~~	~~563~~	~~27~~	–	~~419~~	~~379~~
			19	**3.1**	**1900**	**610**			**70**	**41**	**320**	**12**	**5100**	**560**	**23**		**410**	**370**
500	**360**	**190**	~~24~~	~~4.0~~	~~6488~~	~~773~~	**16**	**11**	~~81~~	~~47~~	~~634~~	~~25~~	~~5535~~	~~615~~	~~32~~	–	~~458~~	~~415~~
			21	**3.4**	**2100**	**670**			**78**	**45**	**350**	**14**	**5500**	**610**	**27**		**450**	**410**

[1] The dissolved metals criteria in this table have been rounded to two (2) significant digits in accordance with subdivision (3), Table 6-2. The equations and conversion factors in subdivision (3), Table 6-2 shall be used instead of the criteria in this table when dissolved metals criteria are used as intermediate values in a calculation, such as in the calculation of water quality-based effluent limitations (WQBELs).

(b) This subsection establishes minimum **surface** water quality for aquatic life. In addition to subsection (a), subdivisions (1) through (5) are established to ensure conditions necessary for the maintenance of a well-balanced aquatic community. ~~Subdivisions (1) through (5)~~ **The following** are applicable at any point in the waters outside of the mixing zone:

(1) There shall be no substances ~~which~~ **that** impart unpalatable flavor to food fish or result in noticeably offensive odors in the vicinity of the water.

(2) No pH values below six (6.0) nor above nine (9.0), except daily fluctuations ~~which~~ **that** exceed pH nine (9.0) and are correlated with photosynthetic activity, shall be permitted.

(3) Concentrations of dissolved oxygen shall average at least five (5.0) milligrams per liter per calendar day and shall not be less than four (4.0) milligrams per liter at any time.

(4) The following conditions for temperature:

(A) There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions.

(B) The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

(C) The maximum temperature rise at any time or place above natural temperatures shall not exceed five **(5)** degrees Fahrenheit ~~(5°F)~~ (two and eight-tenths **(2.8)** degrees Celsius) ~~(2.8°C))~~ in streams and three **(3)** degrees Fahrenheit ~~(3°F)~~ (one and seven-tenths **(1.7)** degrees Celsius) ~~(1.7°C))~~ in lakes and reservoirs.

(D) Water temperatures shall not exceed the maximum limits in the following table during more than one percent (1%) of the hours in the twelve (12) month period ending with any month; at

no time shall the water temperature at such locations exceed the maximum limits in Table ~~3~~ **6-4** by more than three **(3)** degrees Fahrenheit ~~(3°F)~~ (one and seven-tenths **(1.7)** degrees Celsius): ~~(1.7°C)).~~

TABLE ~~3~~ **6-4**

	Ohio River Main Stem °F(°C)	Other Indiana Streams °F(°C)
January	50 (10.0)	50 (10.0)
February	50 (10.0)	50 (10.0)
March	60 (15.6)	60 (15.6)
April	70 (21.1)	70 (21.1)
May	80 (26.7)	80 (26.7)
June	87 (30.6)	90 (32.2)
July	89 (31.7)	90 (32.2)
August	89 (31.7)	90 (32.2)
September	87 (30.7)	90 (32.2)
October	78 (25.6)	78 (25.5)
November	70 (21.1)	70 (21.1)
December	57 (14.0)	57 (14.0)

(5) The following criteria will be used to regulate ammonia:

(A) Except for waters covered in clause (B), at all times, all **surface** waters outside of mixing zones shall be free of substances in concentrations ~~which,~~ **that,** on the basis of available scientific data, are believed to be sufficient to injure, be chronically toxic to, or be carcinogenic, mutagenic, or teratogenic to humans, animals, aquatic life, or plants.

(B) For those waters listed in subsection (c), the following ammonia criteria will apply outside the mixing zone:

Maximum Ammonia Concentrations
(Unionized Ammonia as N)***
(mg/l)

pH	Temperature (°C) 0	5	10	15	20	25	30
6.5	0.0075	0.0106	0.0150	0.0211	0.0299	0.0299	0.0299
6.6	0.0092	0.0130	0.0183	0.0259	0.0365	0.0365	0.0365
6.7	0.0112	0.0158	0.0223	0.0315	0.0444	0.0444	0.0444
6.8	0.0135	0.0190	0.0269	0.0380	0.0536	0.0536	0.0536
6.9	0.0161	0.0228	0.0322	0.0454	0.0642	0.0642	0.0642
7.0	0.0191	0.0270	0.0381	0.0539	0.0761	0.0761	0.0761
7.1	0.0244	0.0316	0.0447	0.0631	0.0892	0.0892	0.0892
7.2	0.0260	0.0367	0.0518	0.0732	0.1034	0.1034	0.1034
7.3	0.0297	0.0420	0.0593	0.0837	0.1183	0.1183	0.1183
7.4	0.0336	0.0474	0.0669	0.0946	0.1336	0.1336	0.1336
7.5	0.0374	0.0528	0.0746	0.1054	0.1489	0.1489	0.1489
7.6	0.0411	0.0581	0.0821	0.1160	0.1638	0.1638	0.1638
7.7	0.0447	0.0631	0.0892	0.1260	0.1780	0.1780	0.1780
7.8	0.0480	0.0678	0.0958	0.1353	0.1911	0.1911	0.1911
7.9	0.0510	0.0720	0.1017	0.1437	0.2030	0.2030	0.2030
8.0	0.0536	0.0758	0.1070	0.1512	0.2135	0.2135	0.2135
8.1	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.2	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.3	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.4	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.5	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.6	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.7	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.8	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
8.9	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137
9.0	0.0537	0.0758	0.1071	0.1513	0.2137	0.2137	0.2137

***To calculate total ammonia, divide the number in the table by the value determined by: $1/(10^{pKa-pH} + 1)$.

Where: pKa = 0.09018 + (2729.92/(T + 273.2))
pH = pH of water
T = °C

24-Hour Average Ammonia Concentrations
(Unionized Ammonia as N)***
(mg/l)

pH	Temperature (°C) 0	5	10	15	20	25	30
6.5	0.0005	0.0008	0.0011	0.0015	0.0015	0.0015	0.0015
6.6	0.0007	0.0010	0.0014	0.0019	0.0019	0.0019	0.0019
6.7	0.0009	0.0012	0.0017	0.0024	0.0024	0.0024	0.0024
6.8	0.0011	0.0015	0.0022	0.0031	0.0031	0.0031	0.0031
6.9	0.0014	0.0019	0.0027	0.0038	0.0038	0.0038	0.0038
7.0	0.0017	0.0024	0.0034	0.0048	0.0048	0.0048	0.0048
7.1	0.0022	0.0031	0.0043	0.0061	0.0061	0.0061	0.0061
7.2	0.0027	0.0038	0.0054	0.0077	0.0077	0.0077	0.0077
7.3	0.0034	0.0048	0.0068	0.0097	0.0097	0.0097	0.0097
7.4	0.0043	0.0061	0.0086	0.0122	0.0122	0.0122	0.0122
7.5	0.0054	0.0077	0.0108	0.0153	0.0153	0.0153	0.0153
7.6	0.0068	0.0097	0.0136	0.0193	0.0193	0.0193	0.0193
7.7	0.0086	0.0122	0.0172	0.0242	0.0242	0.0242	0.0242
7.8	0.0092	0.0130	0.0184	0.0260	0.0260	0.0260	0.0260
7.9	0.0098	0.0138	0.0196	0.0276	0.0276	0.0276	0.0276
8.0	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.1	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294

8.2	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.3	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.4	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.5	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.6	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.7	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.8	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
8.9	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294
9.0	0.0103	0.0146	0.0206	0.0294	0.0294	0.0294	0.0294

***To calculate total ammonia, divide the number in the table by the value determined by: $1/(10^{pKa-pH} + 1)$.

Where: pKa = 0.09018 + (2729.92/(T + 273.2))
pH = pH of water
T = °C

(c) This subsection establishes **surface** water quality for cold water fish. In addition to subsections (a) through (b), the following ~~standards~~ **criteria** are established to ensure conditions necessary for the maintenance of a well-balanced, cold water fish community and are applicable at any point in the waters outside of the mixing zone:

(1) Waters designated as salmonid waters and that shall be protected for cold water fish are those waters designated by the Indiana department of natural resources for put-and-take trout fishing.

(2) In the waters listed in subdivision (1), dissolved oxygen concentrations shall not be less than six (6.0) milligrams per liter at any time and shall not be less than seven (7.0) milligrams per liter in areas where spawning occurs during the spawning season and in areas used for imprinting during the time salmonids are being imprinted.

(3) In those waters listed in subdivision (1), the maximum temperature rise above natural shall not exceed two **(2)** degrees Fahrenheit ~~(2°F)~~ (one and one-tenth ~~degree~~ **(1.1) degrees** Celsius) ~~(1.1°C))~~ at any time or place ~~nor,~~ **or,** unless due to natural causes, shall the temperature exceed the following:

(A) Seventy **(70)** degrees Fahrenheit ~~(70°F)~~ (twenty-one and one-tenth **(21.1)** degrees Celsius) ~~(21.1°C))~~ at any time.

(B) Sixty-five **(65)** degrees Fahrenheit ~~(65°F)~~ (eighteen and three-tenths **(18.3)** degrees Celsius) ~~(18.3°C))~~ during spawning and imprinting periods.

(d) This subsection establishes bacteriological quality for recreational uses. In addition to subsection (a), the criteria in this subsection are to be used to evaluate waters for full body contact recreational uses, to establish wastewater treatment requirements, and to establish effluent limits during the recreational season, which is defined as the months of April through October, inclusive. E. coli bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period.

(e) This subsection establishes surface water quality for public water supply. In addition to subsections (a) and (d), the following ~~standards~~ **criteria** are established to protect the surface water quality at the point at which water is withdrawn for treatment for public supply:

(1) The coliform bacteria group shall not exceed **the following:**

(A) Five thousand (5,000) per one hundred (100) milliliters **as** a monthly average value (either MPN or MF count). ~~nor exceed this number~~

(B) Five thousand (5,000) per one hundred (100) milliliters in more than twenty percent (20%) of the samples examined during any month. ~~nor exceed~~

(C) Twenty thousand (20,000) per one hundred (100) ~~milliliter~~ **milliliters** in more than five percent (5%) of ~~such~~ **the** samples **examined during any month.**

(2) Taste and odor producing substances, other than naturally occurring, shall not interfere with the production of a finished water by conventional treatment consisting of coagulation, sedimentation, filtration, and disinfection.

(3) The concentrations of either chlorides or sulfates shall not exceed two hundred fifty (250) milligrams per liter other than due to naturally occurring sources.

(4) The concentration of dissolved solids shall not exceed seven hundred fifty (750) milligrams per liter other than due to naturally occurring sources. A specific conductance of one thousand two hundred (1,200) micromhos per centimeter (at twenty-five (25) degrees Celsius) may be considered equivalent to a dissolved solids concentration of seven hundred fifty (750) milligrams per liter.

~~(4)~~ **(5)** Surface waters shall be considered acceptable for public ~~supplies~~ **water supply** if radium-226 and strontium-90 are present in amounts not exceeding three (3) and ten (10) picocuries per liter, respectively. In the known absence of strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed one thousand (1,000) picocuries per liter.

~~(5)~~ **(6)** Chemical constituents in the waters shall not be present in such levels as to prevent, after conventional treatment, meeting the drinking water standards contained in 327 IAC 8-2, due to other than natural causes.

(f) This subsection establishes **surface** water quality for industrial water supply. In addition to subsection (a), the ~~standard~~ **criterion** to ensure protection of water quality at the point at which water is withdrawn for use (either with or without treatment) for industrial cooling and processing is that, other than from naturally occurring sources, the dissolved solids shall not exceed seven hundred fifty (750) milligrams per liter at any time. A specific conductance of one thousand two hundred (1,200) micromhos per ~~centimeters~~ **centimeter** (at twenty-five **(25)** degrees Celsius) ~~(25°C))~~ may be considered equivalent to a dissolved solids concentration of seven hundred fifty (750) milligrams per liter.

(g) This subsection establishes **surface** water quality for agricultural uses. The ~~standards~~ **criteria** to ensure water quality conditions necessary for agricultural use are the same as those in subsection (a).

(h) This subsection establishes **surface** water quality for limited uses. The quality of waters classified for limited uses ~~pursuant to~~ **under** section 3(a)(5) of this rule shall, at a minimum, meet the following ~~standards.~~ **criteria:**

(1) The ~~standards contained~~ **criteria** in subsection (a).

(2) The ~~standards contained~~ **criteria** in subsection (d).

(3) The ~~standards contained~~ **criteria** in subsection (f), where applicable.

(4) The waters must be aerobic at all times.

(5) Notwithstanding the preceding subdivisions, the quality of a limited use stream at the point where it becomes physically or chemically capable of supporting a higher use or at its interface with a higher use water segment shall meet the ~~standards which~~ **criteria that** are applicable to the higher use water.

(i) This subsection establishes **surface** water quality for exceptional uses. Waters classified for exceptional uses warrant extraordinary protection. Unless ~~standards~~ **criteria** are otherwise specified on a case-by-case basis, the quality of all waters designated for exceptional use shall be maintained without degradation.

~~(j) Notwithstanding section 7 of this rule, the acute aquatic and chronic aquatic criteria (AAC and CAC) established in subsection (a) shall apply to the underground portion of the Lost River system and other underground streams and their tributaries that support fish or other higher aquatic life forms.~~ *(Water Pollution Control Board; 327 IAC 2-1-6; filed Sep 24, 1987, 3:00 p.m.: 11 IR 581; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1020; errata, 13 IR 1861; errata filed Jul 6, 1990, 5:00 p.m.: 13 IR 2003; filed Feb 26, 1993, 5:00 p.m.: 16 IR 1725; errata filed May 7, 1993, 4:00 p.m.: 16 IR 2189; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1348; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)*

SECTION 6. 327 IAC 2-1-8 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-8 Methods of analysis
Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3
Affected: IC 13-18-4

Sec. 8. The analytical procedures used as methods of analysis to determine the chemical, bacteriological, biological, and radiological quality of waters sampled shall be in accordance with 40 CFR 136 ~~the sixteenth edition of Standard Methods for the Examination of Water and Wastewater,~~ or methods approved by the commissioner. ~~and the Environmental Protection Agency.~~ *(Water Pollution Control Board; 327 IAC 2-1-8; filed Sep 24, 1987, 3:00 p.m.: 11 IR 583; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1033)*

SECTION 7. 327 IAC 2-1-8.1 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-8.1 Calculation of criteria for toxic substances; general
Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3
Affected: IC 13-18-4

Sec. 8.1. **(a)** Water quality standards for the state of Indiana indicate that all **surface** waters at all times and at all places, including the mixing zone, shall be free of substances or combinations of substances ~~which~~ **that** are in amounts sufficient to be acutely toxic to humans, other animals, plants, or aquatic life. Toxic substances include, but are not limited to, those substances identified under Section 307(a) of the Clean Water Act. The allowable concentration of a toxic substance in surface water shall be determined for that substance by the procedures in sections 8.2 through ~~8.8~~ **8.9** of this rule.

(b) The use of dissolved metal to set and measure compliance with water quality standards for aquatic life is the recommended approach because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. Reasons for the consideration of total recoverable metals criteria include risk management considerations not covered by evaluation of water column toxicity. The commissioner may, after considering sediment and food chain effects for a particular metal, decide to take a more conservative approach for the metal. This approach could include the expression of aquatic life criteria for the metal in the form of total recoverable metal. If the commissioner determines that it is appropriate to express aquatic life criteria for a particular metal in the form of dissolved metal, the criteria shall be determined as follows:

(1) If sufficient toxicological data in the form of dissolved metal are available, these data shall be used in sections 8.2, 8.3, and 8.9 of this rule to derive aquatic life criteria directly in the form of dissolved metal.

(2) If sufficient toxicological data in the form of dissolved metal are not available, aquatic life criteria shall be derived in the form of total recoverable metal using the procedures in sections 8.2, 8.3, and 8.9 of this rule and then multiplied by criteria conversion factors approved by the commissioner to express the criteria in the form of dissolved metal.

(3) If sufficient toxicological data in the form of dissolved metal are not available and criteria conversion factors for the particular metal have not been approved by the commissioner, aquatic life criteria shall be derived in the form of total recoverable metal using the procedures in sections 8.2, 8.3, and 8.9 of this rule and expressed in the form of total recoverable metal.

(Water Pollution Control Board; 327 IAC 2-1-8.1; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1033; errata filed Jul 6, 1990, 5:00 p.m.: 13 IR 2003)

SECTION 8. 327 IAC 2-1-8.2 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-8.2 Determination of acute aquatic criteria (AAC)
Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3
Affected: IC 13-18-4

Sec. 8.2. In order to ensure that the concentration of a substance or combination of substances does not become acutely toxic to aquatic organisms, an acute aquatic criterion (AAC) will be determined by one (1) of the following methods:

(1) The following for Method 1:

(A) If no AAC is available in section ~~6(a)(2)~~ **6(a)(3),** Table ~~1~~ **6-1** of this rule **or section 6(a)(3), Table 6-2 of this rule** for the substance, ~~or if a different AAC can be scientifically justified based on new toxicological data, or site-specific conditions concerning water quality characteristics, or species present,~~ an AAC can be calculated using the procedures in **this** subdivision. ~~(2).~~

~~(B) Alternatively, or in addition to those criteria in section 6(a)(1)(D) of this rule, a site-specific acute aquatic criterion based on whole effluent toxicity can be utilized. This criterion shall not exceed ten percent (10%) mortality above control mortality, as measured by the most sensitive species tested, in one hundred percent (100%) effluent. The toxicity of the whole effluent shall be determined as follows:~~

~~(i) Three (3) species will be tested initially, and these will represent species from ecologically diverse taxa to the extent possible. The exact species to be tested will be determined by the commissioner on a case-by-case basis with the objective of using resident or representative species. Once the toxicity of the effluent has been characterized, only the most sensitive of the species tested need to be used in such further testing as may be required.~~

~~(ii) Whole effluent toxicity testing will be required on up to three (3) sets of composite effluent samples to determine the variability of the effluent.~~

~~(2) The following for Method 2:~~

~~(A)~~ **(B)** An acute criterion can be calculated using modified U.S. EPA procedures when acute toxicity data are available for at least five (5) North American genera of freshwater organisms, including representatives of the following families:

(i) The family Salmonidae.

(ii) The family Cyprinidae or Centrarchidae.

(iii) Another family, not represented in item (i) or (ii), in the Class Osteichthyes.

(iv) The family Daphnidae.

(v) Another aquatic macroinvertebrate family.

~~(B)~~ **(C)** Resident species data are preferred for the above required data set. If one (1) or more of the required families are not a site resident, the requirement may be waived and appropriate substitution will be made. If data are not available for resident species, data for nonresident species may be substituted and will be assumed to be representative of resident species. ~~In addition, site-specific modifications to acute aquatic life criteria developed in accordance with this clause may be developed when the local water characteristics such as pH, hardness, temperature, or color alter the biological availability or toxicity of a pollutant.~~ The AAC is calculated using the following procedures:

(i) If the acute toxicity of the chemical has not been adequately shown to be related to a water quality characteristic, such as hardness, pH, or temperature, the AAC is calculated using the following procedures:

(AA) For each species for which at least one (1) acute value is available, the species mean acute value (SMAV) is calculated as the geometric mean of the results of all tests in which the concentrations of test material were stable as shown by measured values. For a species for which no such result is available, the SMAV should be calculated as the geometric mean of all available acute values, ~~i.e.,~~ **for example,** results of flow-through tests in which the concentrations were not measured and results of static and renewal tests based on initial concentrations of test material.

(BB) For each genus for which one (1) or more SMAVs are available, the genus mean acute value (GMAV) is calculated as the geometric mean of the SMAVs available for the genus.

(CC) The GMAVs are ordered from high to low.

(DD) Ranks (R) are assigned to the GMAVs from "1" for the lowest to "N" for the highest. If two (2) or more GMAVs are identical, successive ranks are arbitrarily assigned.

(EE) The cumulative probability, P, is calculated for each GMAV as R/(N + 1).

(FF) The (T) GMAVs (T = 2 for N = 5; T = 3 for N = 6 or 7; T = 4 for N = 8 or greater) are selected ~~which~~ **that** have cumulative probabilities closest to five-hundredths (0.05). If there are less than fifty-nine (59) GMAVs, these will always be the two (2) (for N = 5), three (3) (for N = 6 or 7), or four (4) (for N = 8 or greater) lowest GMAVs.

(GG) Using the selected GMAVs and Ps, the final acute value (FAV) is calculated as:

$$S^2 = \frac{{}^{*}E((\ln GMAV)^2) - ((E(\ln GMAV))^2/T)}{E(P) - ((E(\sqrt{P}))^2/T)}$$

$$L = (E(\ln GMAV) - S(E(\sqrt{P})))/T$$

$$A = S(\sqrt{0.05}) + L$$

$$FAV = e^A$$

$$AAC = FAV/2$$

$${}^{*}E = \text{Summation}$$

(HH) If, for a commercially, recreationally, or ecologically important species, the geometric mean of the acute values from flow-through tests in which the concentrations of test material were measured is lower than the calculated FAV, then that geometric mean is used as the FAV instead of the calculated FAV.

(ii) If data are available to show that acute toxicity to two (2) or more species is similarly related to a water quality characteristic, the AAC is calculated using the procedures as follows:

(AA) For each species for which comparable acute toxicity values are available at two (2) or more different values of the water quality characteristic, a least squares regression of the acute toxicity values on the corresponding values of the water quality characteristic is performed to obtain the slope of the curve that describes the relationship. Because the best documented relationship is that between hardness and acute toxicity of metals and a log-log relationship fits these data, geometric means and natural logarithms of both toxicity and water quality are used in the rest of this procedure to illustrate the method. For relationships based on other water quality characteristics, such as pH or temperature, no transformation or a different transformation might fit the data better, and appropriate changes will be made as necessary throughout this method.

(BB) Each acute slope is evaluated as to whether or not it is meaningful, taking into account the range and number of tested values of the water quality characteristic and the degree of agreement within and between species. If meaningful slopes are not available for at least one (1) fish and one (1) invertebrate, or if the available slopes are too dissimilar, or if too few data are available to adequately define the relationship between acute toxicity and the water quality characteristic, the AAC is calculated using the procedures in item (i).

(CC) Individually, for each species, the geometric mean of the available acute values is calculated and then each of the acute values for a species is divided by the mean for the species. This normalizes the acute values so that the geometric mean of the normalized values for each species individually and for any combination of species is one (1.0).

(DD) The values of the water quality characteristic are similarly normalized for each species individually.

(EE) All the normalized data are treated as if they were for the same species and a least squares regression of all the normalized acute values on the corresponding normalized values of the water quality characteristic is performed to obtain the pooled acute slope, V.

(FF) For each species the geometric mean, W, of the acute toxicity values and the geometric mean, X, of the water quality characteristic are calculated. (These were calculated in subitems (CC) through (DD).)

(GG) For each species the logarithmic intercept, Y, is calculated using the equation:

$$Y = \ln W - V(\ln X - \ln Z)$$

(HH) For each species calculate the SMAV at Z using the equation:

$$SMAV = e^{Y}$$

(II) Obtain the FAV at Z by using the procedures described in subitems (BB) through (HH), replacing "value" with "intercept".

(JJ) The final acute equation is written as:

$$\text{final acute value (FAV)} = e^{(V\ (\ln\ (\text{water quality characteristic})) + \ln A - V\ (\ln Z))}$$

Where: V = pooled acute slope (from subitem (EE))

A = FAV at Z (from subitem (II))

Since V, A, and Z are known, the FAV can be calculated for any selected value of the water quality characteristic.

(KK) The AAC is equal to the FAV/2.

~~(C)~~ **(D)** If data are not available for at least five (5) North American freshwater genera meeting the requirements in clause ~~(A),~~ **(B),** go to subdivision ~~(3).~~ **(2).**

~~(3)~~ **(2)** The following for Method ~~3.~~ **(2):**

(A) If the required data to derive the AAC in subdivision ~~(2)(B)~~ **(1)(C)** are not present in the acute toxicity data base and at least one (1) LC_{50} value is available for a daphnid species and either fathead minnow, bluegill, or rainbow trout, a FAV is calculated by dividing the lowest SMAV for the daphnid species, fathead minnow, bluegill, and rainbow trout by five (5) if rainbow trout are represented or ten (10) if rainbow trout are not represented. The AAC equals the FAV divided by two (2). If appropriate, the AAC will be made a function of a water quality characteristic in a manner similar to that described in subdivision ~~(2)(B)(ii).~~ **(1)(C)(ii).**

(B) If the data required in clause (A) are not available, no AAC can be calculated and the discharger will be required to develop the minimum data base (ninety-six (96) hour LC_{50} for rainbow trout, fathead minnow, or bluegill and a forty-eight (48) hour LC_{50} for a daphnid) needed to calculate the AAC.

(Water Pollution Control Board; 327 IAC 2-1-8.2; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1033; errata filed Jul 6, 1990, 5:00 p.m.: 13 IR 2004; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1357; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 9. 327 IAC 2-1-8.3 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-8.3 Determination of chronic aquatic criterion (CAC)

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4

Sec. 8.3. In order to ensure that the concentration of a substance or combination of substances does not produce chronic effects

on aquatic organisms, a chronic aquatic criterion (CAC) will be determined by one (1) of the following methods:

(1) The following for Method 1:

(A) If no CAC is given for the substance in section ~~6(a)(2)~~ **6(a)(3),** Table ~~1~~ **6-1** of this rule, ~~or if different CAC can be scientifically justified based on new toxicological data, or site-specific conditions concerning water quality characteristics or species present,~~ **or section 6(a)(3), Table 6-2 of this rule,** a CAC can be calculated using the procedures in **this** subdivision. ~~(2).~~

~~(B) Alternatively, or in addition to the CAC in section 6(a)(2) of this rule, a site-specific CAC based on whole effluent toxicity can be utilized. This criterion shall not exceed the no observable effect level (NOEL) based on an appropriate chronic toxicity test, as measured by the most sensitive species tested, at an effluent dilution equal to that provided by no more than one-fourth (¼) of the $Q_{7,10}$ flow of the receiving stream. The toxicity of the whole effluent shall be determined as follows:~~

~~(i) Three (3) species will be tested initially, and these will represent species from ecologically diverse taxa to the extent possible. The exact species to be tested will be determined by the commissioner on a case-by-case basis with the objective of using resident or representative species. Once the toxicity of the effluent has been characterized, only the most sensitive of the species tested need be used in such further testing as may be required.~~

~~(ii) Whole effluent toxicity testing will be required on up to three (3) sets of composite effluent samples to determine the variability of the effluent.~~

~~(2) The following for Method 2:~~

~~(A)~~ **(B)** The CAC is derived in the same manner as the FAV in section ~~8.2(2)~~ **8.2(1)** of this rule by substituting CAC for FAV, chronic for acute, MATC (maximum acceptable toxicant concentration) for LC_{50}, SMCV (species mean chronic value) for SMAV, and GMCV (genus mean chronic value) for GMAV.

~~(B)~~ **(C)** If chronic toxicity data are not available for at least five (5) North American freshwater genera meeting the requirements in section ~~8.2(2)(A)~~ **8.2(1)(B)** of this rule, go to subdivision ~~(3).~~ **(2).**

~~(C) Site-specific modifications to chronic aquatic life criteria developed in accordance with this section may be developed when the local water characteristics, such as pH, hardness, temperature, or color, alter the biological availability or toxicity of a pollutant.~~

~~(3)~~ **(2)** The following for Method ~~3:~~ **2:**

(A) The CAC can be calculated by dividing the FAV by an acute-chronic ratio (or geometric mean of the acute-chronic ratios if more than one (1) is available) for at least one (1) North American freshwater species.

(B) If no acute-chronic ratio is available for at least one (1) North American freshwater species, go to subdivision ~~(4).~~ **(3).**

~~(4)~~ **(3)** The following for Method ~~4:~~ **3:**

(A) The CAC can be calculated by dividing the FAV by a factor of forty-five (45). If, for a commercially, recreationally, or ecologically important species, the geometric mean of the chronic values is lower than the calculated CAC, then that geometric mean is used as the CAC instead of the calculated CAC.

(B) If the data needed in clause (A) are not available, no CAC can be calculated and the discharger will be required to develop the minimum data base necessary to calculate the CAC (ninety-six (96) hour LC_{50} for rainbow trout, fathead minnow, or bluegill and a forty-eight (48) hour LC_{50} for a daphnid).

(Water Pollution Control Board; 327 IAC 2-1-8.3; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1035; errata, 13 IR 1861; errata filed Jul 6, 1990, 5:00 p.m.: 13 IR 2004; errata filed Jul 24, 1990, 4:55 p.m.: 13 IR 2138; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1359)

SECTION 10. 327 IAC 2-1-8.9 IS ADDED TO READ AS FOLLOWS:

327 IAC 2-1-8.9 Site-specific modifications to criteria

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-15-4-1; IC 13-18-4

Sec. 8.9. (a) Site-specific modifications to criteria must be protective of designated uses and aquatic life or human health. In addition, any site-specific modifications that result in less stringent criteria must be based on a sound scientific rationale and shall not be likely to jeopardize the continued existence of endangered or threatened species listed or proposed under Section 4 of the Endangered Species Act (ESA) or result in the destruction or adverse modification of such species' critical habitats. More stringent modifications shall be developed to protect endangered or threatened species listed or proposed

under Section 4 of the ESA where such modifications are necessary to ensure that water quality is not likely to jeopardize the continued existence of such species or result in the destruction or adverse modification of such species' critical habitats. More stringent modifications may also be developed to protect candidate (C1) species being considered by the U.S. Fish and Wildlife Service (FWS) for listing under Section 4 of the ESA where such modifications are necessary to protect such species. Criteria may be modified on a site-specific basis to reflect local environmental conditions as restricted by the following provisions:

(1) Aquatic life criteria may be modified on a site-specific basis as follows:

(A) Aquatic life criteria may be modified on a site-specific basis to provide an additional level of protection.

(B) Less stringent site-specific modifications to chronic or acute aquatic life criteria may be developed when either of the following conditions applies:

(i) The local water quality characteristics, such as pH, hardness, temperature, or color, alter the biological availability or toxicity of a pollutant.

(ii) The sensitivity of the aquatic organisms species that occur at the site differs from the species actually tested in developing the criteria.

(C) Less stringent modifications may also be developed to acute and chronic aquatic life criteria to reflect local physical and hydrological conditions.

(D) Any modifications to protect threatened or endangered aquatic species required by this subsection may be accomplished using either of the two (2) following procedures:

(i) If the species mean acute value (SMAV) for a listed or proposed species or for a surrogate of such species is lower than the calculated final acute value (FAV), such lower SMAV may be used instead of the calculated FAV in developing site-specific modified criteria.

(ii) The site-specific criteria may be calculated using the recalculation procedure for site-specific modifications as described in EPA's Water Quality Standards Handbook, Second Edition-Revised (1994) Chapter 3 and Appendix L.

(2) Human health criteria may be modified on a site-specific basis as follows:

(A) Human health criteria may be modified on a site-specific basis to provide an additional level of protection in accordance with the following:

(i) Human health criteria shall be modified on a site-specific basis to provide additional protection appropriate for highly exposed subpopulations.

(ii) Any person may request the commissioner to develop a site-specific modification of a human health criterion to make it more stringent.

(iii) The commissioner shall develop the site-specific modification of the human health criterion to make it more stringent when local fish consumption rates are higher than the rate used to derive human health criteria under sections 8.5

and 8.6 of this rule and determined according to clause (C).

(B) Less stringent site-specific modifications to human health criteria may be developed when local fish consumption rates are lower than the rate used to derive human health criteria under sections 8.5 and 8.6 of this rule and determined according to clause (C).

(C) Local fish consumption rates referenced in clauses (A) and (B) shall be determined by a fish consumption survey applicable to the site.

(b) Upon receipt of an application for a site-specific modification to a water quality criterion, the commissioner shall provide notice, request comment, and, if requested, schedule and hold a public meeting on the application in accordance with 327 IAC 5-2-11.2.

(Note: IDEM is currently discussing the approval process for site-specific modifications to criteria with U.S. EPA Region 5 and could not reach a conclusion by the deadline for the submission of this draft rule. Therefore, IDEM is inserting this place holder in the rules to inform interested parties that IDEM intends to add rule language to this effect prior to preliminary adoption. The rule language will provide the details of the approval process and could include a detailed methodology for developing site-specific modifications to criteria if U.S. EPA would approve such a methodology.)

(c) The following site-specific modifications to water quality criteria have been granted:

Table 8.9-1

Site-Specific Surface Water Quality Criteria[1]

Waterbody	Starting Location	Ending Location	Substances	AAC (Maximum) (µg/l)	AAC Conversion Factors	CAC (4-Day Average) (µg/l)	CAC Conversion Factors
Richland Creek	The outfall of the Princeton POTW	The confluence of Richland Creek with McCarty Ditch	Copper (Dissolved)	$e^{(0.9422\ [1n(hardness)]-1.4076)}$	0.960	$e^{(0.8545\ [1n(hardness)]-1.4097)}$	0.960
			Cyanide (Free)	45.8		10.7	
			Lead (Dissolved)	$e^{(1.273\ [1n(hardness)]-1.1856)}$	1.46203-[(ln hardness)(0.145712)]	$e^{(1.273\ [1n(hardness)]-3.6853)}$	1.46203-[(ln hardness)(0.145712)]
Wabash River	The outfall of the Smurfit-Stone Corporation (river mile 387)	A point 2 miles downstream	Cyanide (Free)	45.8		10.7	
Wabash River	The outfall of Eli-Lilly and Company (river mile 309)	A point 2 miles downstream	Copper (Dissolved)	$e^{(0.9422\ [1n(hardness)]-1.4076)}$	0.960	$e^{(0.8545\ [1n(hardness)]-1.4097)}$	0.960
Wabash River	The outfall of Eli-Lilly and Company (river mile 236)	A point 2 miles downstream	Lead (Dissolved)	$e^{(1.273\ [1n(hardness)]-1.1856)}$	1.46203-[(ln hardness)(0.145712)]	$e^{(1.273\ [1n(hardness)]-3.6853)}$	1.46203-[(ln hardness)(0.145712)]
West Fork White River	The outfall of the Belmont POTW (river mile 227)	The Marion-Johnson County line (river mile 220)	Cadmium (Dissolved)	$e^{(1.128\ [1n(hardness)]-1.708)}$	1.136672-[(ln hardness)(0.041838)]	$e^{(0.7852\ [1n(hardness)]-2.9232)}$	1.101672-[(ln hardness)(0.041838)]
			Copper (Dissolved)	$e^{(0.9422\ [1n(hardness)]-1.4076)}$	0.960	$e^{(0.8545\ [1n(hardness)]-1.4097)}$	0.960
			Cyanide (Free)	45.8		10.7	
			Lead (Dissolved)	$e^{(1.273\ [1n(hardness)]-1.1856)}$	1.46203-[(ln hardness)(0.145712)]	$e^{(1.273\ [1n(hardness)]-3.6853)}$	1.46203-[(ln hardness)(0.145712)]

[1] The AAC and CAC columns of this table contain hardness-based total recoverable metals criteria for cadmium, copper, and lead. The criterion for the dissolved metal is calculated by multiplying the appropriate conversion factor by the AAC or CAC. This dissolved AAC or CAC shall be rounded to two (2) significant digits, except when the criteria are used as intermediate values in a calculation, such as in the calculation of water quality-based effluent limitations (WQBELs).

(Water Pollution Control Board; 327 IAC 2-1-8.9)

SECTION 11. 327 IAC 2-1-9 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-9 Definitions

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3
Affected: IC 13-11-2-265; IC 13-18-3-2; IC 13-18-4

Sec. 9. In addition to the definitions contained in IC 13-11-2 and 327 IAC 1, the following definitions apply throughout this title:

(1) "Acceptable daily intake" or "ADI" represents the maximum amount of a substance ~~which~~ **that** if ingested daily for a lifetime results in no adverse effects to humans.

(2) "Acute aquatic criterion" or "AAC" means the highest concentration of chemical that if met instream will protect the aquatic life present from mortality or other irreversible effects due to short term exposure. The AAC is equal to one-half (½) the final acute value (FAV).

(3) "Acute toxicity" means ~~the ability of a chemical to cause a debilitating or injurious change in an organism which results from a single or short term~~ **concurrent and delayed adverse effects that result from an acute** exposure ~~to the chemical.~~ **and occur within any short observation period which begins when the exposure begins, may extend beyond the exposure period, and usually does not constitute a substantial portion of the life span of the organism.**

(4) "Adverse effect" means any deleterious effect to organisms due to exposure to a substance. The term includes effects that are or may become debilitating, harmful, or toxic to the normal functions of the organism, but does not include nonharmful effects, such as tissue discoloration alone or the induction of enzymes involved in the metabolism of the substance.

~~(4)~~ **(5)** "Bioaccumulative chemical of concern" or "BCC" ~~means any chemical which, upon entering the surface waters, by itself or as its transformation product, bioaccumulates in aquatic organisms by a factor greater than one thousand (1,000) at six percent (6%) lipids.~~ **refers to the following substances:**

Table 9-1

Bioaccumulative Chemicals of Concern

CAS Number	Substance
309002	Aldrin
57749	Chlordane
72548	4,4'-DDD; p,p'-DDD; 4,4'-TDE; p,p'-TDE
72559	4,4'-DDE; p,p'-DDE
50293	4,4'-DDT; p,p'-DDT
60571	Dieldrin
72208	Endrin
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene; hexachloro-1,3-butadiene
608731	Hexachlorocyclohexanes; BHCs
319846	alpha-Hexachlorocyclohexane; alpha-BHC
319857	beta-Hexachlorocyclohexane; beta-BHC
319868	delta-Hexachlorocyclohexane; delta-BHC
58899	Lindane; gamma-hexachlorocyclohexane; gamma-BHC
7439976	Mercury
2385855	Mirex
29082744	Octachlorostyrene

1336363	**PCBs; polychlorinated biphenyls**
608935	**Pentachlorobenzene**
39801144	**Photomirex**
1746016	**2,3,7,8-TCDD; dioxin**
634662	**1,2,3,4-Tetrachlorobenzene**
95943	**1,2,4,5-Tetrachlorobenzene**
8001352	**Toxaphene**

~~(5)~~ **(6)** "Bioconcentration" ~~is the increase in concentration of the chemical of concern and its metabolites in or on the target organisms (or specified tissues thereof) relative to the concentration of the chemical of concern in~~ **means the net accumulation of a substance by an aquatic organism as a result of uptake directly from** the ambient water **through gill membranes or other external body surfaces.**

~~(6)~~ **(7)** "Bioconcentration factor" or "BCF" ~~is the number used to relate substance residue~~ **means the ratio (in liters per kilogram) of a substance's concentration** in **tissue of an** aquatic ~~organisms~~ **organism** to ~~the~~ **its** concentration ~~of the substance~~ in the ~~waters~~ **ambient water** in ~~which the organisms reside.~~ **situations where the organism is exposed through the water only and the ratio does not change substantially over time.**

~~(7)~~ **(8)** "Carcinogen" means a chemical ~~which~~ **that** causes an increased incidence of benign or malignant neoplasms, or a substantial decrease in the latency period between exposure and onset of neoplasms through oral or dermal exposure, or through inhalation exposure when the cancer occurs at nonrespiratory sites in at least one (1) mammalian species or man through epidemiological ~~and/or~~ **studies or** clinical studies, **or both.**

~~(8)~~ **(9)** "Chronic aquatic criterion" or "CAC" means the highest concentration of chemical that if met instream will protect the aquatic life present from toxic effects due to long term exposure, ~~e.g.,~~ **for example,** adverse effects on growth and reproduction.

~~(9)~~ **(10)** "Chronic toxicity" means ~~the ability of a chemical to cause an injurious or debilitating effect in an organism which results from repeated~~ **concurrent and delayed adverse effects that occur only as a result of a chronic** exposure. ~~to a chemical for a time period representing a substantial portion of the natural life expectancy of that organism.~~

~~(10)~~ **(11)** "Coliform bacteria" means all the aerobic and facultatively anaerobic, gram-negative, nonsporeforming bacilli that produce acid and gas from the fermentation of lactose.

~~(11)~~ **(12)** "Community" means a general collective term to describe the varieties of aquatic species and associated organisms living together in a waterbody.

(13) "Criteria conversion factor" means the fraction of the metal corresponding to an estimate of the percent of the total recoverable metal that was dissolved in the aquatic toxicity tests that were most important in the derivation of the criterion for the metal. Criteria conversion factors are multiplied by acute and chronic aquatic criteria developed using toxicological data in the form of total recoverable metal to express the criteria in the form of dissolved metal.

(14) "Criterion" means a definite numerical value or narrative statement promulgated by the board to maintain or enhance water quality to provide for and fully protect designated use of the waters of the state.

~~(12)~~ **(15)** "Discharge-induced mixing" or "DIM" means mixing initiated by the use of submerged, high rate diffuser outfall structures ~~which~~ **(or the functional equivalent) that** provide turbulent initial mixing and will minimize organism exposure time.

~~(13)~~ **(16)** "Effluent" means a wastewater discharge from a point source to the waters of the state.

(17) "Endangered or threatened species" includes those species that are listed as endangered or threatened under Section 4 of the Endangered Species Act (ESA).

(18) "ESA" means the Endangered Species Act (ESA), 16 U.S.C. 1531 et seq.

(19) "Exceptional use water" means any water designated as an exceptional use water by the water pollution control board, regardless of when the designation occurred.

~~(14)~~ **(20)** "Final acute value" or "FAV" means:

(A) a calculated estimate of the concentration of a ~~substance~~ **test material such** that ~~is lower than all but five~~ **ninety-five** percent ~~(5%)~~ **(95%)** of the ~~mean acute values (MAVs) that cause a specific level of~~ **genera (with which acceptable** acute toxicity ~~to an aquatic taxon in laboratory test.~~ **tests have been conducted on the material) have higher genus mean acute values (GMAVs); or**

(B) the species mean acute value (SMAV) of an important or critical species, if the SMAV is lower than the calculated estimate.

~~(15)~~ **(21)** "Full body contact" means direct contact with the water to the point of complete submergence.

(22) "Genus mean acute value" or "GMAV" means the geometric mean of the SMAVs for the genus.

(23) "Genus mean chronic value" or "GMCV" means the geometric mean of the SMCVs for the genus.

~~(16)~~ **(24)** "Geometric mean" means the Nth root of the product of N quantities. Alternatively, the geometric mean can be calculated by adding the logarithms of the N numbers, dividing the sum by N, and taking the antilog of the quotient.

~~(17)~~ **(25)** "Great Lakes system" has the ~~same definition in this rule as contained under 327 IAC 2-1.5-2(42).~~ **meaning set forth in 327 IAC 2-1.5-2(44).**

~~(18)~~ **(26)** "Ground water" means ~~such accumulations of underground water, natural and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon this state, but excluding manmade underground storage or conveyance structures.~~ **water located below the ground surface in interconnected voids and pore spaces in the zone of saturation.**

~~(19)~~ **(27)** "Human life cycle safe concentration" or "HLSC" is the highest concentration of a chemical to which a human is exposed continuously for a lifetime and ~~which~~ **that** results in no observable adverse effects to **a** human and its progeny.

~~(20)~~ **(28)** "Indigenous" means, generally, an organism native to and growing and reproducing in a particular region. For purposes of this rule, ~~this~~ **the** term also includes historically nonnative species introduced by the Indiana department of natural resources as part of a program of wildlife management whether such species reproduce or not.

~~(21)~~ **(29)** "LC_{50}" ~~means the median lethal~~ **refers to a statistically or graphically estimated** concentration ~~which~~ **that** is ~~the concentration of a test material in a suitable diluent at which~~ **expected to be lethal to** fifty percent (50%) of ~~the exposed organisms die during~~ a ~~specified time period.~~ **group of organisms under specified conditions.**

~~(22)~~ **(30)** "LD_{50}" means the median lethal dose of a chemical, which is the amount of a test material per body weight ~~which,~~ **that,** when administered, results in fifty percent (50%) mortality to the organisms during a specified time period.

~~(23)~~ **(31)** "Life cycle safe concentration" means the highest concentration of a chemical to which an organism is exposed continuously for a lifetime and ~~which~~ **that** results in no observable adverse effects to the organism and its progeny.

~~(24) "Limit of quantification" means a concentration of an analyte at which one can state with a degree of confidence, using the most sensitive analytical test method approved by EPA, for that sample matrix that an analyte is present at a specific concentration in the sample tested.~~

~~(25) "Log K_{ow}" means the log (base 10) of the n-octanol/water partition coefficient.~~

~~(26)~~ **(32)** "Lowest observable adverse effect level" or "LOAEL" means the lowest tested **dose or** concentration ~~causing the occurrence of an injurious or debilitating~~ **of a substance that resulted in an observed adverse** effect **in exposed test organisms when all higher doses or concentrations resulted in the same or more severe effects.**

~~(27)~~ **(33)** "MATC" means the maximum acceptable toxicant concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration ~~which~~ **that** did not cause the occurrence of a specified adverse effect. An upper chronic limit is the lowest tested concentration ~~which~~ **that** did cause the occurrence of a specified adverse effect and above which all tested concentrations caused such an occurrence.

~~(28)~~ **(34)** "Maximum contaminant level" or "MCL" means the maximum permissible level of a contaminant in water ~~which~~ **that** is delivered to the free-flowing outlet of the ultimate user of a public water ~~supply~~ system.

~~(29) "Mean acute value" or "MAV" means the concentration of a substance that causes a specific level of acute toxicity to aquatic organisms in some taxonomic group.~~

~~(30)~~ **(35)** "Mixing zone" means an area contiguous to a discharge where the discharged wastewater mixes with the receiving waters. Where the quality of the effluent is lower than that of the receiving waters, it may not be possible to attain within the mixing zone all beneficial uses ~~which~~ **that** are attained outside the zone. The mixing zone should not be considered a place where effluents are treated.

~~(31)~~ **(36) "No observed adverse effect level" or** "NOAEL" ~~means~~ **is** the highest ~~level of toxicant which results~~ **tested dose or concentration of a substance that resulted** in no ~~observable~~ **observed** adverse ~~effects to~~ **effect in** exposed test organisms **where higher doses or concentrations resulted in an adverse effect.**

~~(32) "n-octanol/water partition coefficient (K_{ow})" means the ratio of the octanol to water equilibrium concentrations of a compound.~~

~~(33)~~ **(37)** "Nonthreshold mechanism" means a process ~~which~~ **that** results in some possible effect no matter what level is present.

There is no level ~~which~~ **that** may not produce an effect.

(38) "Occur at the site" includes the species, genera, families, orders, classes, and phyla that:

(A) are usually present at the site;

(B) are present at the site only seasonally due to migration;

(C) are present intermittently because they periodically return to or extend their ranges into the site;

(D) were present at the site in the past, are not currently present at the site due to degraded conditions, and are expected to return to the site when conditions improve; or

(E) are present in nearby bodies of water, are not currently present at the site due to degraded conditions, and are expected to be present at the site when conditions improve.

The taxa that occur at the site cannot be determined merely by sampling downstream and upstream of the site at one (1) point in time. The term does not include taxa that were once present at the site but cannot exist at the site now due to permanent physical alteration of the habitat at the site, for example, alterations resulting from dams.

(39) "Octanol-water partition coefficient" or "K_{OW}" means the ratio of the concentration of a substance in the n-octanol phase to its concentration in the aqueous phase in an equilibrated two-phase octanol-water system. For log K_{OW}, the log of the octanol-water partition coefficient is a base ten (10) logarithm.

(40) "Outstanding national resource water" means a water designated as such by the general assembly after recommendations by the water pollution control board and the environmental quality service council under IC 13-18-3-2(o) and IC 13-18-3-2(p). The designation must describe the quality of the outstanding national resource water to serve as the benchmark of the water quality that shall be maintained and protected. Waters that may be considered for designation as outstanding national resource waters include waterbodies that are recognized as:

(A) important because of protection through official action, such as:

(i) federal or state law;

(ii) presidential or secretarial action;

(iii) international treaty; or

(iv) interstate compact;

(B) having exceptional recreational significance;

(C) having exceptional ecological significance;

(D) having other special environmental, recreational, or ecological attributes; or

(E) waters with respect to which designation as an outstanding national resource water is reasonably necessary for protection of other waterbodies designated as outstanding national resource waters.

(41) "Outstanding state resource water" means any water designated as such by the water pollution control board regardless of when the designation occurred or occurs. Waters that may be considered for designation as outstanding state resource waters include waterbodies that have unique or special ecological, recreational, or aesthetic significance.

~~(34)~~ **(42)** "Persistent substance" means a chemical that is long-lived in soil, aquatic environments, and animal and plant tissues and is not readily broken down by biological or physiochemical processes.

~~(35)~~ **(43)** "Point source" means ~~a~~ **the following:**

(A) Any discernible, confined, and discrete conveyance, **including, but not limited to, any of the following** from which ~~wastewater is~~ **pollutants are** or may be discharged: ~~to waters of the state.~~

(i) Pipe.

(ii) Ditch.

(iii) Channel.

(iv) Tunnel.

(v) Conduit.

(vi) Well.

(vii) Discrete fissure.

(viii) Container.

(ix) Rolling stock.

(x) Concentrated animal feeding operation.

(xi) Landfill leachate collection system.

(xii) Vessel.

(xiii) Other floating craft.

(B) The term does not include return flows from irrigated agriculture or agricultural storm run-off. See 327 IAC 5-2-4(a)(4) for other exclusions.

~~(36)~~ **(44)** "Policy", as employed herein, means a statement of administrative practice or decision making guidelines to be followed or implemented to the maximum extent feasible with respect to an identified problematic situation but to be less than strictly enforceable in contrast to a standard or rule of law.

~~(37)~~ **(45)** "Public water supply" means ~~any wells, reservoirs, lakes, rivers, sources of supply, pumps, mains, pipes, facilities, and structures through which water is obtained, treated as may be required, and supplied through a water distribution system for sale to or consumption by the public for drinking, domestic, or other purposes, including state-owned facilities even though the water may not be sold to the~~ **a source of water for a** public **water system.**

(46) "Public water system" has the meaning set forth in 42 U.S.C. 300f.

~~(38)~~ **(47)** "Risk" means the probability that a substance, when released to the environment, will cause an adverse effect in exposed humans or other living organisms.

~~(39)~~ **(48)** "Risk assessment" means the analytical process used to determine the level of risk.

(49) "Species mean acute value" or "SMAV" means the geometric mean of the results of all acceptable flow-through acute toxicity tests (for which the concentrations of the test material were measured) with the most sensitive tested life stage of the species. For a species for which no such result is available for the most sensitive tested life stage, the SMAV is the geometric mean of the results of all acceptable acute toxicity tests with the most sensitive tested life stage.

(50) "Species mean chronic value" or "SMCV" means the geometric mean of the results of all acceptable life-cycle and partial life-cycle toxicity tests with the species; for a species of fish for which no such result is available, the SMCV is the geometric mean of all acceptable early life-stage tests.

~~(40) "Standard" means a definite numerical value or narrative statement promulgated by the board to maintain or enhance water quality to provide for and fully protect designated use of the waters of the state.~~

~~(41)~~ **(51)** "Steady-state" means an equilibrium condition has been achieved in the body burden of a substance in an organism. This is assumed when the rate of loss of a substance matches its rate of uptake.

~~(42)~~ **(52)** "Surface waters of the state" or "surface water" ~~means such accumulations of water on the land surface, natural and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon this state, but the term does not include any private pond or any pond, reservoir, or facility built for reduction or control of pollution or cooling water prior to discharge unless the discharge therefrom causes or threatens to cause water pollution.~~ **has the meaning set forth in IC 13-11-2-265, except that the term does not include underground waters with the exception of the following:**

(A) The underground portion of the Lost River and its underground tributaries.

(B) Any other underground stream that supports fish or other higher aquatic life forms and its underground tributaries.

~~(43)~~ **(53)** "Terrestrial life cycle safe concentration" or "TLSC" is the highest concentration of chemical to which wildlife is exposed continuously for a lifetime and ~~which~~ **that** results in no observable adverse effects to wildlife and its progeny.

~~(44)~~ **(54)** "Threshold mechanism" means a process ~~which~~ **that** results in some effect if a certain level is exceeded, but ~~which~~ **that** produces no effect below that level.

~~(45)~~ **(55)** "Toxic substances" means substances ~~which~~ **that** are or may become harmful to: ~~plant or animal:~~

(A) aquatic life;

(B) humans;

(C) other animals;

(D) plants; or ~~to~~

(E) food chains;

when present in sufficient concentrations or combinations. Toxic substances include, but are not limited to, those pollutants identified as toxic under Section 307(a)(1) of the Clean Water Act.

~~(46)~~ **(56)** "Variance" means a deviation from a water quality standard.

~~(47) "Waters of the state" means such accumulations of water, surface and underground, natural and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon this state, but the term does not include any~~

~~private pond, or any pond, reservoir, or facility built for reduction or control of pollution or cooling of water prior to discharge unless the discharge therefrom causes or threatens to cause water pollution.~~

~~(48)~~ **(57)** "Water use designations" means a use of the waters of the state as established by this rule, including, but not limited to, **the following:**

(A) Industrial water supply.

(B) Agricultural use.

(C) Public water supply.

(D) Full body contact.

(E) Aquatic life.

(F) Limited use. ~~and~~

(G) Exceptional use.

(58) "Waters of the state" has the meaning set forth in IC 13-11-2-265.

~~(49)~~ **(59)** "Well-balanced aquatic community" means an aquatic community ~~which~~ **that** is diverse in species composition, contains several different trophic levels, and is not composed mainly of strictly pollution tolerant species.

~~(50)~~ **(60)** "Zone of initial dilution" or "ZID" means ~~that~~ **the** area of the receiving ~~stream~~ **water directly** after the end of the pipe where an instantaneous volume of water gives **up to** a one-to-one **(1:1)** dilution of the discharge.

(Water Pollution Control Board; 327 IAC 2-1-9; filed Sep 24, 1987, 3:00 p.m.: 11 IR 584; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1041; errata filed Jul 6, 1990, 5:00 p.m.: 13 IR 2004; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1360; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 12. 327 IAC 2-1-12 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1-12 Incorporation by reference

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4

Sec. 12. The following materials have been incorporated by reference into this rule. Each of the following items, in addition to its title, will list the name and address of where it may be located for inspection and copying:

(1) Clean Water Act (CWA) 33 U.S.C. 1251 et seq. in effect ~~December 16, 1996,~~ **July 1, 2003,** available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or from the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(2) Code of Federal Regulations (40 CFR 136) in effect ~~December 16, 1996,~~ **July 1, 2003,** available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(3) U.S. EPA Water Quality Standards Handbook, Second Edition-Revised (1994) Chapter 3 and Appendix L, available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water Quality, Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(Water Pollution Control Board; 327 IAC 2-1-12; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1363; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 13. 327 IAC 2-1.5-2 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-2 Definitions

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-11-2-265; IC 13-18-3-2; IC 13-18-4

Sec. 2. In addition to the definitions contained in IC 13-11-2 and 327 IAC 1, the following definitions apply throughout this article, 327 IAC 5, and 327 IAC 15:

(1) "Acceptable daily exposure" or "ADE" means an estimate of the maximum daily dose of a substance ~~which~~ **that** is not expected to result in adverse noncancer effects to the general human population, including sensitive subgroups.

(2) "Acceptable endpoints" (subchronic and chronic), for the purpose of wildlife criteria derivation, means those endpoints that affect reproductive or developmental success, organismal viability or growth, or any other endpoint that is, or is directly related to, a parameter that influences population dynamics.

(3) "Acute-chronic ratio" or "ACR" means a standard measure of the acute toxicity of a material divided by an appropriate measure of the chronic toxicity of the same material under comparable conditions.

(4) "Acute toxic unit" or "TU_a" means $100/LC_{50}$ where the LC_{50} is expressed as a percent effluent in the test medium of an acute whole effluent toxicity (WET) test that is statistically or graphically estimated to be lethal to fifty percent (50%) of the test organisms.

(5) "Acute toxicity" means concurrent and delayed adverse effects that result from an acute exposure and occur within any short observation period, which begins when the exposure begins, may extend beyond the exposure period, and usually does not constitute a substantial portion of the life span of the organism.

(6) "Adverse effect" means any deleterious effect to organisms due to exposure to a substance. The term includes effects that are or may become debilitating, harmful, or toxic to the normal functions of the organism, but does not include nonharmful effects, such as tissue discoloration alone or the induction of enzymes involved in the metabolism of the substance.

(7) "Alternate mixing zone" means a mixing zone granted by the commissioner under 327 IAC 5-2-11.4(b)(4) for a particular pollutant and a particular criterion or value that is larger than that specified in 327 IAC 5-2-11.4(b)(2) or 327 IAC 5-2-11.4(b)(3).

~~(7)~~ **(8)** "Baseline BAF" means the following:

(A) For organic chemicals, a BAF that is based on the concentration of freely dissolved chemical in the ambient water and takes into account the partitioning of the chemical within the organism.

(B) For inorganic chemicals, a BAF that is based on the wet weight of the tissue.

~~(8)~~ **(9)** "Baseline BCF" means the following:

(A) For organic chemicals, a BCF that is based on the concentration of freely dissolved chemical in the ambient water and takes into account the partitioning of the chemical within the organism.

(B) For inorganic chemicals, a BCF that is based on the wet weight of the tissue.

~~(9)~~ **(10)** "Bioaccumulation" means the net accumulation of a substance by an organism as a result of uptake from all environmental sources.

~~(10)~~ **(11)** "Bioaccumulation factor" or "BAF" means the ratio (in L/kg) of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, in situations where both the organism and its food are exposed and the ratio does not change substantially over time.

~~(11)~~ **(12)** "Bioaccumulative chemical of concern" or "BCC" has the meaning set forth in section 6 of this rule.

~~(12)~~ **(13)** "Bioconcentration" means the net accumulation of a substance by an aquatic organism as a result of uptake directly from the ambient water through gill membranes or other external body surfaces.

~~(13)~~ **(14)** "Bioconcentration factor" or "BCF" means the ratio (in liters per kilogram) of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, in situations where the organism is exposed through the water only and the ratio does not change substantially over time.

~~(14)~~ **(15)** "Biota-sediment accumulation factor" or "BSAF" means the ratio (in kilograms of organic carbon per kilogram of lipid) of a substance's lipid-normalized concentration in tissue of an aquatic organism to its organic carbon-normalized concentration in surface sediment, in situations where:

(A) the ratio does not change substantially over time;

(B) both the organism and its food are exposed; and

(C) the surface sediment is representative of average surface sediment in the vicinity of the organism.

~~(15)~~ **(16)** "Carcinogen" means a substance that causes an increased incidence of benign or malignant neoplasms, or substantially decreases the time to develop neoplasms, in animals or humans. The classification of carcinogens is discussed in section ~~13(b)(1)~~ **14(b)(1)** of this rule.

~~(16)~~ **(17)** "Chronic effect", for purposes of wildlife criteria derivation, means:

(A) an adverse effect that is measured by assessing an acceptable endpoint; and

(B) results from continual exposure over several generations, or at least over a significant part of the test species' projected life span or life stage.

~~(17)~~ **(18)** "Chronic toxic unit" or "TU_c" means 100/NOEC or 100/IC_{25}, where the NOEC and IC_{25} are expressed as a percent effluent in the test medium.

~~(18)~~ **(19)** "Chronic toxicity" means concurrent and delayed adverse effects that occur only as a result of a chronic exposure.

~~(19)~~ **(20)** "Clean Water Act" or "CWA" means the federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq.).

~~(20)~~ **(21)** "Coliform bacteria" means all the aerobic and facultatively anaerobic, gram-negative, nonsporeforming bacilli that produce acid and gas from the fermentation of lactose.

~~(21)~~ **(22)** "Community" means a general collective term to describe the varieties of aquatic species and associated organisms living together in a waterbody.

(23) "Criteria conversion factor" means the fraction of the metal corresponding to an estimate of the percent of the total recoverable metal that was dissolved in the aquatic toxicity tests that were most important in the derivation of the criterion for the metal. Criteria conversion factors are multiplied by acute and chronic aquatic criteria developed using toxicological data in the form of total recoverable metal to express the criteria in the form of dissolved metal.

~~(22) "Criteria"~~ **(24) "Criterion"** means a definite numerical value or narrative statement promulgated by the board to maintain or enhance water quality to provide for and fully protect designated uses of the waters of the state.

~~(23)~~ **(25)** "Criterion continuous concentration" or "CCC" means an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect.

~~(24)~~ **(26)** "Criterion maximum concentration" or "CMC" means an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed briefly without resulting in an unacceptable effect.

~~(25)~~ **(27)** "Depuration" means the loss of a substance from an organism as a result of any active or passive process.

~~(26)~~ **(28)** "Designated uses" has the meaning set forth in section 5 of this rule, whether or not they are being attained.

~~(27)~~ **(29)** "EC_{50}" refers to a statistically or graphically estimated concentration that is expected to cause one (1) or more specified effects in fifty percent (50%) of a group of organisms under specified conditions.

~~(28)~~ **(30)** "Effluent" means a wastewater discharge from a point source to the waters of the state.

~~(29)~~ **(31)** "Endangered or threatened species" includes those species that are listed as endangered or threatened under Section 4 of the Endangered Species Act (ESA).

~~(30)~~ **(32)** "ESA" means the Endangered Species Act (ESA), 16 U.S.C. 1531, ~~through 16 U.S.C. 1544.~~ **et seq.**

~~(31)~~ **(33)** "Existing uses" includes those uses actually attained in the waterbody on or after November 28, 1975, whether or not they are included under section 5 of this rule.

~~(32)~~ **(34)** "Final acute value" or "FAV" means:

(A) a calculated estimate of the concentration of a test material such that ninety-five percent (95%) of the genera (with which acceptable acute toxicity tests have been conducted on the material) have higher GMAVs; or

(B) the SMAV of an important or critical species, if the SMAV is lower than the calculated estimate.

~~(33)~~ **(35)** "Final chronic value" or "FCV" means:

(A) a calculated estimate of the concentration of a test material such that ninety-five percent (95%) of the genera (with which acceptable chronic toxicity tests have been conducted on the material) have higher GMCVs;

(B) the quotient of an FAV divided by an appropriate acute-chronic ratio; or

(C) the SMCV of an important or critical species, if the SMCV is lower than the calculated estimate or the quotient, whichever is applicable.

~~(34)~~ **(36)** "Final plant value" or "FPV" means the lowest plant value that was obtained with an important aquatic plant species in an acceptable toxicity test for which the concentrations of the test material were measured and the adverse effect was biologically important.

~~(35)~~ **(37)** "Food-chain multiplier" or "FCM" means the ratio of a BAF to an appropriate BCF.

~~(36)~~ **(38)** "Full body contact" means direct contact with the water to the point of complete submergence.

~~(37)~~ **(39)** "Genus mean acute value" or "GMAV" means the geometric mean of the SMAVs for the genus.

~~(38)~~ **(40)** "Genus mean chronic value" or "GMCV" means the geometric mean of the SMCVs for the genus.

~~(39)~~ **(41)** "Geometric mean" means the Nth root of the product of N quantities. Alternatively, the geometric mean can be calculated by adding the logarithms of the N numbers, dividing the sum by N, and taking the antilog of the quotient.

~~(40)~~ **(42)** "Great Lakes" means Lake Erie and Lake Michigan.

~~(41)~~ **(43)** "Great Lakes states" means Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.

~~(42)~~ **(44)** "Great Lakes system" means all the streams, rivers, lakes, and other waters of the state within the drainage basin of the Great Lakes within Indiana.

~~(43)~~ **(45)** "Great Lakes water quality wildlife criterion" or "GLWC" means the concentration of a substance that is likely to, if not exceeded, protect avian and mammalian wildlife populations inhabiting the Great Lakes basin from adverse effects resulting from the ingestion of water and aquatic prey taken from surface waters of the Great Lakes system. These criteria are based on existing toxicological studies of the substance of concern and quantitative information about the exposure of wildlife species to the substance, that is, food and water consumption rates. Since toxicological and exposure data for individual wildlife species are limited, a GLWC is derived using a methodology similar to that used to derive noncancer human health criteria. Separate avian and mammalian values are developed using taxonomic class-specific toxicity data and exposure data for five (5) representative Great Lakes basin wildlife species. The following wildlife species selected are representative of avian and mammalian species resident in the Great Lakes basin that are likely to experience the highest exposures to bioaccumulative contaminants through the aquatic food web:

(A) Bald eagle.

(B) Herring gull.

(C) Belted kingfisher.

(D) Mink.

(E) River otter.

~~(44)~~ **(46)** "Ground water" means ~~such accumulations of underground water, natural and artificial, public and private, or parts thereof, which are wholly or partially within, flow through, or border upon this state, but excluding manmade underground storage or conveyance structures.~~ **water located below the ground surface in interconnected voids and pore spaces in the zone of saturation.**

~~(45)~~ **(47)** "High quality waters" means waterbodies in which, on a parameter by parameter basis, the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. The term includes any waterbody for which the pollutant has not been detected in:

(A) the water column; and

(B) nontransient aquatic organisms at levels that would indicate that a water quality criterion is not being met.

~~(46)~~ **(48)** "Human cancer criterion" or "HCC" refers to a human cancer value (HCV) for a pollutant that meets the minimum data requirements for Tier I specified in section 14 of this rule.

~~(47)~~ **(49)** "Human cancer value" or "HCV" means the maximum ambient water concentration of a substance at which a lifetime of exposure will represent a plausible upper-bound risk of contracting cancer of one (1) in one hundred thousand (100,000) using the exposure assumptions specified in section 14 of this rule from either:

(A) drinking the water, consuming fish from the water, and water-related recreational activities; or

(B) consuming fish from the water and water-related recreational activities.

~~(48)~~ **(50)** "Human noncancer criterion" or "HNC" refers to a human noncancer value (HNV) for a pollutant that meets the minimum data requirements for Tier I specified in section 14 of this rule.

~~(49)~~ **(51)** "Human noncancer value" or "HNV" means the maximum ambient water concentration of a substance at which adverse noncancer effects are not likely to occur in the human population from lifetime exposure using section 14 of this rule from either:

(A) drinking the water, consuming fish from the water, and water-related recreational activities; or

(B) consuming fish from the water and water-related recreation activities.

~~(50)~~ **(52)** "Inhibition concentration 25" or "IC_{25}" means the toxicant concentration that would cause a twenty-five percent (25%) reduction in a nonquantal biological measurement for the test population. For example, the IC_{25} is the concentration of toxicant that would cause a twenty-five percent (25%) reduction in mean young per female or in growth for the test population.

~~(51)~~ **(53)** "LC_{50}" refers to a statistically or graphically estimated concentration that is expected to be lethal to fifty percent (50%) of a group of organisms under specified conditions.

~~(52)~~ **(54)** "Linearized multistage model" means a conservative mathematical model for cancer risk assessment. This model fits linear dose-response curves to low doses. It is consistent with a no-threshold model of carcinogenesis, that is, exposure to even a very small amount of the substance is assumed to produce a finite increased risk of cancer.

~~(53)~~ **(55)** "Lowest observed adverse effect level" or "LOAEL" means the lowest tested dose or concentration of a substance that resulted in an observed adverse effect in exposed test organisms when all higher doses or concentrations resulted in the same or more severe effects.

~~(54)~~ **(56)** "Maximum contaminant level" or "MCL" means the maximum permissible level of a contaminant in water that is delivered to the free-flowing outlet of the ultimate user of a public water ~~supply~~ system.

~~(55)~~ **(57)** "Mixing zone" means an area contiguous to a discharge where the discharged wastewater mixes with the receiving water. Where the quality of the effluent is lower than that of the receiving water, it may not be possible to attain within the mixing zone all beneficial uses attained outside the zone. The mixing zone should not be considered a place where effluents are treated.

~~(56)~~ **(58)** "New Great Lakes discharger" has the meaning set forth in 327 IAC 5-1.5-36.

~~(57)~~ **(59)** "No observed adverse effect level" or "NOAEL" is the highest tested dose or concentration of a substance that resulted in no observed adverse effect in exposed test organisms where higher doses or concentrations resulted in an adverse effect.

~~(58)~~ **(60)** "No observed effect concentration" or "NOEC" is the highest concentration of toxicant to which organisms are exposed in a full life cycle or partial life cycle (short term) test, that causes no observable adverse effects on the test organisms, that is, the highest concentration of toxicant in which the values for the observed responses are not statistically significantly different from the controls.

~~(59)~~ **(61)** "Nonthreshold mechanism" means a process that results in some possible effect no matter what level is present. There is no level that may not produce an effect.

~~(60)~~ **(62)** "Occur at the site" includes the species, genera, families, orders, classes, and phyla that:

(A) are usually present at the site;

(B) are present at the site only seasonally due to migration;

(C) are present intermittently because they periodically return to or extend their ranges into the site;

(D) were present at the site in the past, are not currently present at the site due to degraded conditions, and are expected to return to the site when conditions improve; or

(E) are present in nearby bodies of water, are not currently present at the site due to degraded conditions, and are expected to be present at the site when conditions improve.

The taxa that occur at the site cannot be determined merely by sampling downstream and upstream of the site at one (1) point in time. The term does not include taxa that were once present at the site but cannot exist at the site now due to permanent physical alteration of the habitat at the site, for example, alterations resulting from dams.

~~(61)~~ **(63)** "Octanol-water partition coefficient" or "K_{OW}" means the ratio of the concentration of a substance in the n-octanol phase to its concentration in the aqueous phase in an equilibrated two-phase octanol-water system. For log K_{OW}, the log of the octanol-water partition coefficient is a base ten (10) logarithm.

~~(62)~~ **(64)** "Open waters of Lake Michigan" means all of the waters within Lake Michigan lakeward from a line drawn across the mouth of tributaries to the lake, including all waters enclosed by constructed breakwaters. For the Indiana Harbor Ship Canal, the boundary of the open waters of Lake Michigan is delineated by a line drawn across the mouth of the harbor from the East Breakwater Light (1995 United States Coast Guard Light List No. 19675) to the northernmost point of the LTV Steel property along the west side of the harbor.

~~(63)~~ **(65)** "Outstanding national resource ~~waters"~~ **water"** means ~~those waters~~ **a water** designated as such by ~~Indiana~~ **the general assembly after recommendations by the water pollution control board and the environmental quality service council under IC 13-18-3-2(o) and IC 13-18-3-2(p).** The designation ~~shall~~ **must** describe the quality of ~~such waters~~ **the outstanding national resource water** to serve as the benchmark of the water quality that shall be maintained and protected. Waters that may be considered for designation as outstanding national resource waters include ~~but are not limited to,~~ waterbodies that are recognized as:

(A) important because of protection through official action, such as:

(i) federal or state law;

(ii) presidential or secretarial action;

(iii) international treaty; or

(iv) interstate compact;

(B) having exceptional recreational significance;

(C) having exceptional ecological significance;

(D) having other special environmental, recreational, or ecological attributes; or

(E) waters ~~whose~~ **with respect to which** designation as **an** outstanding national resource ~~waters~~ **water** is reasonably necessary for ~~the~~ protection of other ~~waters so~~ **waterbodies** designated **as outstanding national resource waters.**

~~(64)~~ **(66)** "Outstanding state resource ~~waters"~~ **water"** means ~~those waters~~ **any water** designated as such by ~~Indiana.~~ **the water pollution control board regardless of when the designation occurred or occurs. Waters that may be considered for designation as outstanding state resource waters include waterbodies that have unique or special ecological, recreational, or aesthetic significance.**

~~(65)~~ **(67)** "Point source" has the meaning set forth in 327 IAC 5-1.5-40.

~~(66)~~ **(68)** "Policy" means a statement of administrative practice or decision making guidelines to be followed or implemented to the maximum extent feasible with respect to an identified problematic situation but to be less than strictly enforceable in contrast to a standard or rule of law.

~~(67)~~ **(69)** "Public water supply" means ~~any wells, reservoirs, lakes, rivers, sources of supply, pumps, mains, pipes, facilities, and structures through which water is obtained, treated as may be required, and supplied through a water distribution system for sale to or consumption by the public for drinking, domestic, or other purposes, including state-owned facilities even though the water may not be sold to the~~ **a source of water for a** public **water system.**

(70) "Public water system" has the meaning set forth in 42 U.S.C. 300f.

~~(68)~~ **(71)** "Quantitative structure activity relationship" or "QSAR" or "structure activity relationship" or "SAR" refers to a mathematical relationship between a property (activity) of a chemical and a number of descriptors of the chemical. These descriptors are chemical or physical characteristics obtained experimentally or predicted from the structure of the chemical.

~~(69)~~ **(72)** "Relative source contribution" or "RSC" means the factor (percentage) used in calculating a HNV or HNC to account for all sources of exposure to a contaminant. The RSC reflects the percent of total exposure that may be attributed to surface water through water intake and fish consumption.

~~(70)~~ **(73)** "Risk" means the probability that a substance, when released to the environment, will cause an adverse effect in exposed humans or other living organisms.

~~(71)~~ **(74)** "Risk assessment" means the analytical process used to determine the level of risk.

~~(72)~~ **(75)** "Risk associated dose" or "RAD" refers to a dose of a known or presumed carcinogenic substance in milligrams per kilogram per day, which, over a lifetime of exposure, is estimated to be associated with a plausible upper bound incremental cancer risk equal to one (1) in one hundred thousand (100,000).

(76) "Secondary continuous concentration" or "SCC" means an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The SCC differs from the criterion continuous concentration (CCC) in that fewer data are required to calculate the SCC than the CCC.

(77) "Secondary maximum concentration" or "SMC" means an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The SMC differs from the criterion maximum concentration (CMC) in that fewer data are required to calculate the SMC than the CMC.

~~(73)~~ **(78)** "Slope factor", also known as "q_1*", means the incremental rate of cancer development calculated through use of a linearized multistage model or other appropriate model. It is expressed in milligrams per kilogram per day of exposure to the chemical in question.

~~(74)~~ **(79)** "Species mean acute value" or "SMAV" means the geometric mean of the results of all acceptable flow-through acute toxicity tests (for which the concentrations of the test material were measured) with the most sensitive tested life stage of the species. For a species for which no such result is available for the most sensitive tested life stage, the SMAV is the geometric mean of the results of all acceptable acute toxicity tests with the most sensitive tested life stage.

~~(75)~~ **(80)** "Species mean chronic value" or "SMCV" means the geometric mean of the results of all acceptable life-cycle and partial life-cycle toxicity tests with the species; for a species of fish for which no such result is available, the SMCV is the geometric mean of all acceptable early life-stage tests.

~~(76)~~ **(81)** "Steady-state" means an equilibrium condition has been achieved in the body burden of a substance in an organism. Steady state is assumed when the rate of loss of a substance matches its rate of uptake.

~~(77)~~ **(82)** "Stream design flow" means the stream flow that represents critical conditions, upstream from the source, for protection of aquatic life, human health, or wildlife.

~~(78)~~ **(83)** "Subchronic effect" means an adverse effect, measured by assessing an acceptable endpoint, resulting from continual exposure for a period of time less than that deemed necessary for a chronic test.

~~(79)~~ **(84)** "Surface waters of the state" or "surface water" ~~means:~~

~~(A) either:~~

~~(i) the accumulations of water, surface and underground, natural and artificial, public and private; or~~

~~(ii) a part of the accumulations of water;~~

~~that are wholly or partially within, flow through, or border upon Indiana; and~~

~~(B)~~ **has the meaning set forth in IC 13-11-2-265 except that** the term does not include

~~(i) a private pond; or~~

~~(ii) an off-stream pond, reservoir, or facility built for reduction or control of pollution or cooling of water before discharge, unless the discharge from the pond, reservoir, or facility causes or threatens to cause water pollution.~~ **underground waters with the exception of the following:**

(A) The underground portion of the Lost River and its underground tributaries.

(B) Any other underground stream that supports fish or other higher aquatic life forms and its underground tributaries.

~~(80)~~ **(85)** "Threshold effect" means an effect of a substance for which there is a theoretical or empirically established dose or concentration below which the effect does not occur.

~~(81)~~ **(86)** "Tier I criteria" means numeric values derived by use of the Tier I procedures in sections 11 and 13 through 16 of this rule that either have been adopted as numeric criteria into a water quality standard or are used to implement narrative water quality criteria.

~~(82)~~ **(87)** "Tier I wildlife criterion" means criterion used to denote the number derived from data meeting the Tier I minimum database requirements and will be protective of the two (2) classes of wildlife. The term is synonymous with GLWC, and the two (2) are used interchangeably.

~~(83)~~ **(88)** "Tier II values" means numeric values derived by use of the Tier II procedures in sections 12 through 16 of this rule that are used to implement narrative water quality criteria.

~~(84)~~ **(89)** "Toxic substances" means substances that are or may become harmful to:

(A) aquatic life;

(B) humans;

(C) other animals;

(D) plants; or

(E) food chains;

when present in sufficient concentrations or combinations. Toxic substances include, but are not limited to, those pollutants identified as toxic under Section 307(a)(1) of the Clean Water Act.

~~(85)~~ **(90)** "Tributaries of the Great Lakes system" means all waters of the Great Lakes system that are not open waters of Lake Michigan or connecting channels.

~~(86)~~ **(91)** "Trophic level" means a functional classification of taxa within a community that is based on feeding relationships, for example, aquatic green plants comprise the first trophic level and herbivores comprise the second.

~~(87)~~ **(92)** "Uncertainty factor" or "UF" means one (1) of several numeric factors used in operationally deriving criteria from experimental data to account for the quality or quantity of the available data.

~~(88)~~ **(93)** "Uptake" means acquisition of a substance from the environment by an organism as a result of any active or passive process.

~~(89)~~ **(94)** "Variance" means a deviation from a water quality standard.

~~(90)~~ **(95)** "Water use designations" means a use of the waters of the state as established by this rule, including, but not limited to, the following:

(A) Industrial water supply.

(B) Agricultural use.

(C) Public water supply.

(D) Full body contact.

(E) Aquatic life.

(F) Limited use.

~~(91)~~ **(96)** "Waters of the state" ~~means:~~

~~(A) either:~~

~~(i) the accumulations of water, surface and underground, natural and artificial, or public and private; or~~

~~(ii) a part of the accumulations of water;~~

~~that are wholly or partially within, flow through, or border upon Indiana; and~~

~~(B) the term does not include:~~

~~(i) a private pond; or~~

~~(ii) an off-stream pond, reservoir, or facility built for reduction or control of pollution or cooling of water before discharge, unless the discharge from the pond, reservoir, or facility causes or threatens to cause water pollution.~~ **has the meaning set forth in IC 13-11-2-265.**

~~(92)~~ **(97)** "Well-balanced aquatic community" means an aquatic community that: ~~is:~~

(A) **is** diverse in species composition;

(B) contains several different trophic levels; and

(C) is not composed mainly of pollution tolerant species.

~~(93)~~ **(98)** "Wildlife value" or "WV" means a value used to denote each representative species that results from using the equation presented in section 15 of this rule, the value obtained from averaging species values within a class, or any value derived from application of the site-specific procedure provided in section 16 of this rule. The WVs calculated for the representative species are used to calculate taxonomic class-specific WVs. The WV is the concentration of a substance ~~which,~~ **that,** if not exceeded, should better protect the taxon in question.

~~(94)~~ **(99)** "Zone of initial dilution" or "ZID" means the area of the receiving water directly after the end of the pipe where an instantaneous volume of water gives up to a one-to-one (1:1) dilution of the discharge.

(Water Pollution Control Board; 327 IAC 2-1.5-2; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1363; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 14. 327 IAC 2-1.5-6 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-6 Bioaccumulative chemicals of concern

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4; IC 13-30-2-1

Sec. 6. (a) A bioaccumulative chemical of concern (BCC) is any chemical that meets the following requirements:

(1) Has the potential to cause adverse effects.

(2) Has a half-life of at least eight (8) weeks in the water column, sediment, and biota.

(3) Upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor (BAF) greater than one thousand (1,000) after considering metabolism and other physicochemical properties that might enhance or inhibit bioaccumulation, in accordance with the procedure in section 13 of this rule. The minimum BAF information needed to define a chemical as a BCC is either of the following:

(A) For an organic chemical, either a field-measured BAF or a BAF derived using the BSAF methodology.

(B) For an inorganic chemical, including an organometal, either a field-measured BAF or a laboratory-measured BCF.

(b) Pollutants that are BCCs include, but are not limited to, the following:

Table 6-1

Bioaccumulative Chemicals of Concern

CAS Number	Substance

57749	Chlordane
72548	4,4′-DDD; p,p′-DDD; 4,4′-TDE; p,p′-TDE
72559	4,4′-DDE; p,p′-DDE
50293	4,4′-DDT; p,p′-DDT
60571	Dieldrin
118741	Hexachlorobenzene
87683	Hexachlorobutadiene; hexachloro-1,3-butadiene
608731	Hexachlorocyclohexanes; BHCs
319846	alpha-Hexachlorocyclohexane; alpha-BHC
319857	beta-Hexachlorocyclohexane; beta-BHC
319868	delta-Hexachlorocyclohexane; delta-BHC
58899	Lindane; gamma-hexachlorocyclohexane; gamma-BHC
7439976	Mercury
2385855	Mirex
29082744	Octachlorostyrene
1336363	PCBs; polychlorinated biphenyls
608935	Pentachlorobenzene
39801144	Photomirex
1746016	2,3,7,8-TCDD; dioxin
634662	1,2,3,4-Tetrachlorobenzene
95943	1,2,4,5-Tetrachlorobenzene
8001352	Toxaphene

(c) The substances established in this subsection shall be treated as BCCs under this rule and under 327 IAC 5-2-11.3 through 327 IAC 5-2-11.6. If additional data becomes available (such as a field-measured BAF) for a substance established in this subsection that conclusively demonstrates that the substance should not be treated as a BCC, the commissioner may determine that it is not necessary to treat the substance as a BCC. Substances treated as BCCs include the following:

Table 6-2

Substances Treated as Bioaccumulative Chemicals of Concern

CAS Number	Substance
309002	Aldrin
~~84742~~	~~Dibutyl~~ ~~phthalate~~
72208	Endrin
76448	Heptachlor

(Water Pollution Control Board; 327 IAC 2-1.5-6; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1370; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 15. 327 IAC 2-1.5-8 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-8 Minimum surface water quality criteria

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4; IC 13-30-2-1; IC 14-22-9

Sec. 8. (a) All surface water quality criteria in this section, except those provided in subsection (b)(1), will cease to be applicable when the stream flows are less than the applicable stream design flow for the particular criterion as determined under 327 IAC 5-2-11.4.

(b) The following are minimum **surface** water quality conditions:

(1) All **surface** waters within the Great Lakes system at all times and at all places, including waters within the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges that do any of the following:

(A) Will settle to form putrescent or otherwise objectionable deposits.

(B) Are in amounts sufficient to be unsightly or deleterious.

(C) Produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance.

(D) Are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such degree as to create a nuisance, be unsightly, or otherwise impair the designated uses.

(E) Are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill aquatic life, other animals, plants, or humans. To assure protection of aquatic life, the waters shall meet the following requirements:

(i) Concentrations of toxic substances shall not exceed the **criterion maximum concentration** (CMC) **or secondary maximum concentration (SMC)** outside the zone of initial dilution or the final acute value (FAV = 2 (CMC) **or 2 (SMC))** in the undiluted discharge unless, for a discharge to a receiving stream or Lake Michigan, an alternate mixing zone demonstration is conducted and approved in accordance with 327 IAC 5-2-11.4(b)(4), in which case, the CMC **or SMC** shall be met outside the ~~discharge-induced~~ **applicable alternate** mixing zone:

(AA) for certain substances, a CMC is established and set forth in subdivision (3), Table 8-1, which table incorporates subdivision (4), Table 8-2;

(BB) for substances for which a CMC is not specified in subdivision (3), Table 8-1, a CMC shall be calculated by the commissioner using the procedures in section 11 of this rule, or if the minimum data requirements to calculate a CMC are not met, a ~~secondary maximum concentration~~ SMC shall be calculated using the procedures in section 12 of this rule; and

(CC) the CMC or SMC determined under subitem (AA) or (BB) may be modified on a site-specific basis to reflect local conditions in accordance with section 16 of this rule.

(ii) A discharge shall not cause acute toxicity, as measured by whole effluent toxicity tests, at any point in the waterbody. Compliance with this criterion shall be demonstrated if a discharge does not exceed 1.0 TU_a in the undiluted discharge. For a discharge into a receiving stream or Lake Michigan, for which an alternate mixing zone demonstration is conducted and approved in accordance with 327 IAC 5-2-11.4(b)(4), compliance with this criterion shall be demonstrated if 0.3 TU_a is not exceeded outside the ~~discharge-induced~~ **applicable alternate** mixing zone.

This clause shall not apply to the chemical control of plants and animals when that control is performed in compliance with approval conditions specified by the Indiana department of natural resources as provided by IC 14-22-9.

(2) At all times, all **surface** waters outside of the applicable mixing zones determined in accordance with ~~327 IAC 5-2-11.4(c) through 327 IAC 5-2-11.4(f)~~ **section 7 of this rule** shall be free of substances in concentrations, that, on the basis of available scientific data, are believed to be sufficient to injure, be chronically toxic to, or be carcinogenic, mutagenic, or teratogenic to humans, animals, aquatic life, or plants. To assure protection against the adverse effects identified in this subdivision, a toxic substance or pollutant shall not be present in such waters in concentrations that exceed the most stringent of the following:

(A) A criterion continuous concentration (CCC) or a secondary continuous concentration (SCC) to protect aquatic life from chronic toxic effects as follows:

(i) For certain substances, a CCC is established and set forth in subdivision (3), Table 8-1 (which table incorporates subdivision (4), Table 8-2).

(ii) For substances for which a CCC is not specified in subdivision (3), Table 8-1, a CCC shall be calculated by the commissioner using the procedures in section 11 of this rule, or if the minimum data requirements to calculate a CCC are not met, a SCC shall be calculated using the procedures in section 12 of this rule.

(iii) The CCC or SCC determined under item (i) or (ii) may be modified on a site-specific basis to reflect local conditions in accordance with section 16 of this rule.

(iv) To assure protection of aquatic life, a discharge shall not cause chronic toxicity, as measured by whole effluent toxicity tests, outside of the applicable mixing zone. Compliance with this criterion shall be demonstrated if the waterbody does not

exceed 1.0 TU_c at the edge of the mixing zone.

(B) A human noncancer criterion or value (HNC or HNV) to protect human health from adverse noncancer effects that may result from the consumption of aquatic organisms or drinking water from the waterbody determined as follows:

(i) For certain substances, an HNC is established and set forth in subdivision (5), Table 8-3.

(ii) For substances for which an HNC is not specified in subdivision (5), Table 8-3, an HNC shall be calculated by the commissioner using the procedures in section 14 of this rule, or if the minimum data requirements to calculate a HNC are not met, an HNV shall be calculated using the procedures in section 14 of this rule.

(iii) The HNC or HNV determined under item (i) or (ii) may be modified on a site-specific basis to reflect local conditions in accordance with section 16 of this rule.

(iv) The HNC-nondrinking or HNV-nondrinking for a substance shall apply to all **surface** waters outside the applicable mixing zone for a discharge of that substance. The HNC-drinking or HNV-drinking shall apply at the point of the public ~~drinking~~ water **system** intake.

(C) For carcinogenic substances, a human cancer criterion or value (HCC or HCV) to protect human health from unacceptable cancer risk of greater than one (1) additional occurrence of cancer per one hundred thousand (100,000) population as follows:

(i) For certain substances, an HCC is established and set forth in subdivision (5), Table 8-3.

(ii) For substances for which an HCC is not specified in subdivision (5), Table 8-3, an HCC shall be calculated by the commissioner using the procedures in section 14 of this rule or if the minimum data requirements to calculate a HCC are not met, an HCV shall be calculated using the procedures in section 14 of this rule.

(iii) The HCC or HCV determined under item (i) or (ii) may be modified on a site-specific basis to reflect local conditions in accordance with section 16 of this rule.

(iv) The HCC-nondrinking or HCV-nondrinking for a substance shall apply to all **surface** waters outside the applicable mixing zone for a discharge of that substance. The HCC-drinking or HCV-drinking shall apply at the point of the public ~~drinking~~ water **system** intake.

(D) A wildlife criterion (WC) to protect avian and mammalian wildlife populations from adverse effects which may result from the consumption of aquatic organisms or water from the waterbody as follows:

(i) For certain substances, a WC is established and set forth in **subdivision (6),** Table 8-4.

(ii) For substances for which a WC is not specified in subdivision (6), Table 8-4, a WC shall be calculated by the commissioner using the procedures in section 15 of this rule or if the minimum data requirements to calculate a WC are not met, a wildlife value (WV) may be calculated using the procedures in section 15 of this rule.

(iii) The WC or WV determined under item (i) or (ii) may be modified on a site-specific basis to reflect local conditions in accordance with section 16 of this rule.

(3) The following establishes **surface** water quality criteria for protection of aquatic life:

Table 8-1

Surface Water Quality Criteria for Protection of Aquatic Life[1]

CAS Number	Substances	CMC (Maximum) (µg/l)	CMC Conversion Factors	CCC (4-Day Average) (µg/l)	CCC Conversion Factors
	Metals (dissolved)[2]				
7440382	Arsenic (III)	339.8	1.000	147.9	1.000
7440439	Cadmium	$e^{(1.128\ [\ln(\text{hardness})]-3.6867)}$	~~0.944~~ **1.136672-[(ln hardness)(0.041838)]**	$e^{(0.7852\ [\ln(\text{hardness})]-2.715)}$	~~0.909~~ **1.101672-[(ln hardness)(0.041838)]**
7440473	Chromium (III)	$e^{(0.819\ [\ln(\text{hardness})]+3.7256)}$	0.316	$e^{(0.819\ [\ln(\text{hardness})]+0.6848)}$	0.860
7440473	Chromium (VI)	16.02	0.982	10.98	0.962
7440508	Copper	$e^{(0.9422\ [\ln(\text{hardness})]-1.700)}$	0.960	$e^{(0.8545\ [\ln(\text{hardness})]-1.702)}$	0.960
7439976	Mercury	1.694	~~0.850~~ **0.85**	0.9081	~~0.850~~ **0.85**
7440020	Nickel	$e^{(0.846\ [\ln(\text{hardness})]+2.255)}$	0.998	$e^{(0.846\ [\ln(\text{hardness})]+0.0584)}$	0.997
7782492	Selenium			5	0.922

7440666	Zinc	$e^{(0.8473\ [\ln(\text{hardness})]+0.884)}$	0.978	$e^{(0.8473\ [\ln(\text{hardness})]+0.884)}$	0.986
	Organics (total)				
60571	Dieldrin	0.24	NA	0.056	NA
72208	Endrin	0.086	NA	0.036	NA
56382	Parathion	0.065	NA	0.013	NA
87865	Pentachlorophenol[3]	$e^{(1.005[pH]-4.869)}$	NA	$e^{(1.005[pH]-5.134)}$	NA
	Other Substances				
	Chlorides (total)	860000	NA	230000	NA
	Chlorine (total residual)	19	NA	11	NA
	Chlorine (intermittent, total residual)[4]	200	NA		NA
57125	Cyanide (free)	22	NA	5.2	NA

[1] Aquatic organisms should not be affected unacceptably if the four (4) day average concentration of any substance in this table does not exceed the CCC more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed the CMC more than once every three (3) years on the average, except possibly where a commercially or recreationally important species is very sensitive.

[2] The CMC and CCC columns of this table contain total recoverable metals criteria (numeric and hardness-based). The criterion for the dissolved metal is calculated by multiplying the appropriate conversion factor by the CMC or CCC. This dissolved CMC or CCC shall be rounded to two (2) significant digits, except when the criteria are used as intermediate values in a calculation, such as in the calculation of water quality-based effluent ~~limits~~ **limitations** (WQBELs).

[3] A CMC and CCC calculated for pentachlorophenol using the equation in this table shall be rounded to two (2) significant digits, except when the criteria are used as intermediate values in a calculation, such as in the calculation of water quality-based effluent ~~limits~~ **limitations** (WQBELs).

[4] To be considered an intermittent discharge, total residual chlorine shall not be detected in the discharge for a period of more than forty (40) minutes in duration, and such periods shall be separated by at least five (5) hours.

(4) The following establishes dissolved criterion maximum concentrations (CMCs) and criterion continuous concentrations (CCCs) for certain metals at selected hardness values calculated from the equations and ~~conversions~~ **conversion** factors in subdivision (3), Table 8-1:

Table 8-2

Metals Concentrations in Micrograms Per Liter; Hardness in Milligrams Per Liter $CaCO_3$[1]

	Arsenic (III)		Cadmium		Chromium (III)		**Chromium (VI)**		Copper		**Mercury**		Nickel		**Selenium**		Zinc	
Hardness	**CMC**	**CCC**	CMC	CCC	CMC	CCC	**CMC**	**CCC**	CMC	CCC	**CMC**	**CCC**	CMC	CCC	**CMC**	**CCC**	CMC	CCC
50	**340**	**150**	2.0	1.3	320	42	**16**	**11**	7.0	5.0	**1.4**	**0.77**	260	29	–	**4.6**	65	66
100	**340**	**150**	4.3	2.2	570	74	**16**	**11**	13	9.0	**1.4**	**0.77**	470	52	–	**4.6**	120	120
150	**340**	**150**	~~6.7~~ **6.6**	~~3.1~~ **3.0**	790	100	**16**	**11**	20	13	**1.4**	**0.77**	660	73	–	**4.6**	170	170
200	**340**	**150**	~~9.3~~ **9.0**	~~3.9~~ **3.7**	1,000	130	**16**	**11**	26	16	**1.4**	**0.77**	840	93	–	**4.6**	210	210
250	**340**	**150**	12	~~4.6~~ **4.4**	1,200	160	**16**	**11**	32	20	**1.4**	**0.77**	1,000	110	–	**4.6**	250	260
300	**340**	**150**	~~15~~ **14**	~~5.3~~ **5.0**	1,400	180	**16**	**11**	38	23	**1.4**	**0.77**	1,200	130	–	**4.6**	300	300

350	**340**	**150**	~~18~~ **17**	~~6.0~~ **5.6**	1,600	210	**16**	**11**	44	26	**1.4**	**0.77**	1,400	150	**–**	**4.6**	340	340
400	**340**	**150**	~~20~~ **19**	~~6.6~~ **6.2**	1,800	230	**16**	**11**	50	29	**1.4**	**0.77**	1,500	170	**–**	**4.6**	380	380
450	**340**	**150**	~~23~~ **22**	~~7.3~~ **6.8**	2,000	250	**16**	**11**	55	32	**1.4**	**0.77**	1,700	190	**–**	**4.6**	420	420
500	**340**	**150**	~~26~~ **24**	~~7.9~~ **7.3**	2,100	280	**16**	**11**	61	35	**1.4**	**0.77**	1,800	200	–	**4.6**	460	460

[1] The dissolved metals criteria in this table have been rounded to two (2) significant digits in accordance with subdivision (3), Table 8-1. The equations and conversion factors in subdivision (3), Table 8-1 shall be used instead of the criteria in this table when dissolved metals criteria are used as intermediate values in a calculation, such as in the calculation of water quality-based effluent limitations (WQBELs).

(5) The following establishes **surface** water quality criteria for protection of human health:

Table 8-3

Surface Water Quality Criteria for Protection of Human Health[1]

		Human Noncancer Criteria (HNC)		Human Cancer Criteria (HCC)	
CAS Number	Substances	Drinking (µg/l)	Nondrinking (µg/l)	Drinking (µg/l)	Nondrinking (µg/l)
	Metals (total recoverable)				
7439976	Mercury (including methyl mercury)	0.0018	0.0018		
	Organics (total)				
71432	Benzene	19	510	12	310
57749	Chlordane	0.0014	0.0014	0.00025	0.00025
108907	Chlorobenzene	470	3,200		
50293	DDT	0.002	0.002	0.00015	0.00015
60571	Dieldrin	0.00041	0.00041	6.5×10^{-6}	6.5×10^{-6}
105679	2,4-dimethylphenol	450	8,700		
51285	2,4-dinitrophenol	55	2,800		
118741	Hexachlorobenzene	0.046	0.046	0.00045	0.00045
67721	Hexachloroethane	6	7.6	5.3	6.7
58899	Lindane	0.47	0.5		
75092	Methylene chloride	1,600	90,000	47	2600
1336363	PCBs (class)			6.8×10^{-6}	6.8×10^{-6}
1746016	2,3,7,8-TCDD (dioxin)	6.7×10^{-8}	6.7×10^{-8}	8.6×10^{-9}	8.6×10^{-9}
108883	Toluene	5,600	51,000		
8001352	Toxaphene			6.8×10^{-5}	6.8×10^{-5}
79016	Trichloroethylene			29	370
	Other Substances				
57125	Cyanide (total)	600	48,000		

[1]The HNC and HCC are thirty (30) day average criteria.

(6) The following establishes **surface** water quality criteria for protection of wildlife:

Table 8-4

Surface Water Quality Criteria for Protection of Wildlife[1]

CAS Number	Substances	Wildlife Criteria (µg/l)
	Metals (total recoverable)	
7439976	Mercury (including methylmercury)	0.0013
	Organics (total)	
50293	DDT and metabolites	1.1×10^{-5}
1336363	PCBs (class)	1.2×10^{-4}
1746016	2, 3, 7, 8-TCDD (dioxin)	3.1×10^{-9}

[1]The WC are thirty (30) day average criteria.

(c) This subsection establishes minimum **surface** water quality criteria for aquatic life. In addition to the criteria in subsection (b), this subsection ensures conditions necessary for the maintenance of a well-balanced aquatic community. The following conditions are applicable at any point in the waters outside of the applicable mixing zone, as determined in accordance with section 7 of this rule: ~~and 327 IAC 5-2-11.4(b):~~

(1) There shall be no substances which impart unpalatable flavor to food fish or result in offensive odors in the vicinity of the water.

(2) No pH values below six (6.0) ~~nor~~ **or** above nine (9.0), except daily fluctuations that exceed pH 9.0 and are correlated with photosynthetic activity shall be permitted.

(3) Concentrations of dissolved oxygen shall average at least five (5.0) milligrams per liter per calendar day and shall not be less than four (4.0) milligrams per liter at any time.

(4) The following are conditions for temperature:

(A) No abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions.

(B) The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

(C) Water temperatures shall not exceed the maximum limits as established in this clause during more than one percent (1%) of the hours in the twelve (12) month period ending with any month. At no time shall the water temperature at such locations exceed the maximum limits in the following table by more than three **(3)** degrees Fahrenheit ~~(3°F)~~ (one and seven-tenths **(1.7)** degrees Celsius): ~~(1.7°C)).~~

Table 8-5

Maximum Instream Water Temperatures

	St. Joseph River Tributary to Lake Michigan Upstream of the Twin Branch	All Other Indiana Streams in the Great Lakes System
Month	Dam °F(°C)	°F(°C)
January	50 (10)	50 (10)
February	50 (10)	50 (10)
March	55 (12.8)	60 (15.6)
April	65 (18.3)	70 (21.1)
May	75 (23.9)	80 (26.7)
June	85 (29.4)	90 (32.2)
July	85 (29.4)	90 (32.2)
August	85 (29.4)	90 (32.2)
September	84 (29.4)	90 (32.2)
October	70 (21.1)	78 (25.5)

November	60 (15.6)	70 (21.1)
December	50 (10)	57 (14.0)

(D) The following temperature criteria shall apply to Lake Michigan:

(i) In all receiving waters, the points of measurement normally shall be in the first meter below the surface at such depths necessary to avoid thin layer surface warming due to extreme ambient air temperatures, but, where required to determine the true distribution of heated wastes and natural variations in water temperatures, measurements shall be at a greater depth and at several depths as a thermal profile.

(ii) There shall be no abnormal temperature changes so as to be injurious to fish, wildlife, or other aquatic life, or the growth or propagation thereof. In addition, plume interaction with the bottom shall be minimized and shall not injuriously affect fish, shellfish, and wildlife spawning or nursery areas.

(iii) The normal daily and seasonal temperature fluctuations that existed before the addition of heat shall be maintained.

(iv) At any time and at a maximum distance of a one thousand (1,000) foot arc inscribed from a fixed point adjacent to the discharge or as agreed upon by the commissioner and federal regulatory agencies:

(AA) the receiving water temperature shall not be more than three **(3)** degrees Fahrenheit ~~(3°F)~~ (one and seven-tenths **(1.7)** degrees Celsius) ~~(1.7°C))~~ above the existing natural water temperature; and

(BB) thermal discharges to Lake Michigan shall comply with the following maximum temperature requirements:

(aa) Thermal discharges to Lake Michigan shall not raise the maximum temperature in the receiving water above those listed in the following table, except to the extent the permittee adequately demonstrates that the exceedance is caused by the water temperature of the intake water:

Table 8-6

Maximum Water Temperatures

Month	°F(°C)
January	45 (7)
February	45 (7)
March	45 (7)
April	55 (13)
May	60 (16)
June	70 (21)
July	80 (27)
August	80 (27)
September	80 (27)
October	65 (18)
November	60 (16)
December	50 (10)

(bb) If the permittee demonstrates that the intake water temperature is within three **(3)** degrees Fahrenheit ~~(3°F)~~ below an applicable maximum temperature under subitem (aa), Table 8-6, then no more than a three **(3)** degree Fahrenheit ~~(3°F)~~ exceedance of the maximum water temperature shall be permitted.

(v) The facilities described as follows that discharge into the open waters of Lake Michigan shall be limited to the amount essential for blowdown in the operation of a closed cycle cooling facility:

(AA) All facilities that have new waste heat discharges exceeding a daily average of five-tenths (0.5) billion British thermal units per hour. As used in this item, "new waste heat discharge" means a discharge that had not begun operations as of February 11, 1972.

(BB) All facilities with existing waste heat discharges that increase the quantity of waste heat discharged by more than a daily average of five-tenths (0.5) billion British thermal units per hour.

(vi) Water intakes shall be designed and located to minimize entrainment and damage to desirable organisms. Requirements may vary depending upon local conditions, but, in general, intakes shall have minimum water velocity and shall not be located

in spawning or nursery areas of important fishes. Water velocity at screens and other exclusion devices shall also be at a minimum.

(vii) Discharges other than those now in existence shall be such that the thermal plumes do not overlap or intersect.

(viii) Facilities discharging more than a daily average of five-tenths (0.5) billion British thermal units of waste heat shall continuously record intake and discharge temperature and flow and make those records available to the public or regulatory agencies upon request.

(5) The following criteria shall be used to regulate ammonia:

(A) Concentrations of total ammonia (as N) shall not exceed the CMC outside the zone of initial dilution or the final acute value (FAV = 2 (CMC)) in the undiluted discharge unless, for a discharge to a receiving stream or Lake Michigan, an alternate mixing zone demonstration is conducted and approved in accordance with 327 IAC 5-2-11.4(b)(4), in which case, the CMC shall be met outside the ~~discharge-induced~~ **applicable alternate** mixing zone. The CMC of total ammonia (as N) is determined using the following equation:

$$CMC = \frac{(0.822)(0.52)(10^{(pK_a - pH)} + 1)}{(FT)(FPH)(2)}$$

Where:

$FT = 10^{0.03(20-T)}$

$FPH = 1$; when: $8 \leq pH \leq 9$; or

$\frac{1 + 10^{(7.4 - pH)}}{1.25}$; when: $6.5 \leq pH \leq 8$

$pK_a = 0.09018 + \frac{2729}{T + 273.2}$

$T =$ Temperature in °C

(B) The criterion continuous concentration (CCC) of total ammonia (as N) is determined using the following equation:

$$CCC = \frac{(0.822)(0.80)(10^{(pK_a - pH)} + 1)}{(FT)(FPH)(RATIO)}$$

Where:

$FT = 10^{0.03(20-T)}$

$FPH = 1$; when: $8 \leq pH \leq 9$; or

$\frac{1 + 10^{(7.4 - pH)}}{1.25}$; when: $6.5 \leq pH \leq 8$

$RATIO = 13.5$; when: $7.7 \leq pH \leq 9$; or

$\frac{(20)(10^{(7.7 - pH)})}{1 + 10^{(7.4 - pH)}}$; when: $6.5 \leq pH \leq 7.7$

$pK_a = 0.09018 + \frac{2729}{T + 273.2}$

$T =$ Temperature in °C

(C) The use of the equations in clause (A) results in the following CMCs for total ammonia (as N) at different temperatures and pHs:

Table 8-7

Criterion Maximum Concentrations for Total Ammonia (as N)

	Temperature (°C)						
pH	0	5	10	15	20	25	30
6.5	28.48	26.61	25.23	24.26	23.64	23.32	23.29

6.6	27.68	25.87	24.53	23.59	22.98	22.68	22.65
6.7	26.74	24.99	23.69	22.78	22.20	21.92	21.90
6.8	25.64	23.96	22.72	21.85	21.30	21.03	21.01
6.9	24.37	22.78	21.60	20.78	20.26	20.01	20.00
7.0	22.95	21.45	20.35	19.58	19.09	18.86	18.86
7.1	21.38	19.98	18.96	18.24	17.80	17.59	17.60
7.2	19.68	18.40	17.46	16.81	16.40	16.22	16.24
7.3	17.90	16.73	15.88	15.29	14.93	14.78	14.81
7.4	16.06	15.02	14.26	13.74	13.42	13.30	13.35
7.5	14.23	13.31	12.64	12.19	11.92	11.81	11.88
7.6	12.44	11.65	11.07	10.67	10.45	10.37	10.45
7.7	10.75	10.06	9.569	9.238	9.052	9.003	9.088
7.8	9.177	8.597	8.181	7.907	7.760	7.734	7.830
7.9	7.753	7.268	6.924	6.701	6.589	6.584	6.689
8.0	6.496	6.095	5.813	5.636	5.555	5.569	5.683
8.1	5.171	4.857	4.639	4.508	4.457	4.486	4.602
8.2	4.119	3.873	3.707	3.612	3.584	3.625	3.743
8.3	3.283	3.092	2.967	2.900	2.891	2.942	3.061
8.4	2.618	2.472	2.379	2.335	2.340	2.399	2.519
8.5	2.091	1.979	1.911	1.886	1.903	1.968	2.089
8.6	1.672	1.588	1.540	1.529	1.555	1.625	1.747
8.7	1.339	1.277	1.246	1.246	1.279	1.353	1.475
8.8	1.075	1.030	1.011	1.021	1.060	1.137	1.260
8.9	0.8647	0.8336	0.8254	0.8418	0.8862	0.9650	1.088
9.0	0.6979	0.6777	0.6777	0.6998	0.7479	0.8286	0.9521

(D) The use of the equations in clause (B) results in the following CCCs for total ammonia (as N) at different temperatures and pHs:

Table 8-8

Criterion Continuous Concentrations for Total Ammonia (as N)

	Temperature (°C)						
pH	0	5	10	15	20	25	30
6.5	2.473	2.310	2.191	2.106	2.052	2.025	2.022
6.6	2.473	2.311	2.191	2.107	2.053	2.026	2.023
6.7	2.473	2.311	2.191	2.107	2.054	2.027	2.025
6.8	2.473	2.311	2.192	2.108	2.055	2.028	2.027
6.9	2.474	2.312	2.193	2.109	2.056	2.030	2.030
7.0	2.474	2.312	2.193	2.110	2.058	2.033	2.033
7.1	2.475	2.313	2.195	2.112	2.060	2.036	2.037
7.2	2.475	2.314	2.196	2.114	2.063	2.040	2.043
7.3	2.476	2.315	2.198	2.116	2.066	2.044	2.050
7.4	2.477	2.317	2.200	2.119	2.070	2.050	2.058

7.5	2.478	2.319	2.202	2.123	2.075	2.058	2.069
7.6	2.480	2.321	2.206	2.128	2.082	2.067	2.082
7.7	2.450	2.294	2.181	2.106	2.063	2.052	2.071
7.8	2.092	1.959	1.865	1.802	1.769	1.763	1.785
7.9	1.767	1.657	1.578	1.527	1.502	1.501	1.525
8.0	1.481	1.389	1.325	1.285	1.266	1.269	1.295
8.1	1.179	1.107	1.057	1.027	1.016	1.022	1.049
8.2	0.9387	0.8828	0.8450	0.8232	0.8169	0.8263	0.8531
8.3	0.7481	0.7048	0.6762	0.6610	0.6589	0.6705	0.6976
8.4	0.5968	0.5634	0.5421	0.5321	0.5334	0.5468	0.5741
8.5	0.4766	0.4511	0.4357	0.4298	0.4337	0.4485	0.4760
8.6	0.3811	0.3619	0.3511	0.3485	0.3545	0.3704	0.3981
8.7	0.3052	0.2910	0.2839	0.2839	0.2916	0.3083	0.3362
8.8	0.2450	0.2347	0.2305	0.2326	0.2417	0.2591	0.2871
8.9	0.1971	0.1900	0.1881	0.1919	0.2020	0.2199	0.2480
9.0	0.1591	0.1545	0.1545	0.1595	0.1705	0.1889	0.2170

(d) This subsection establishes **surface** water quality for cold water fish. The waters listed in section ~~5(a)(2)~~ **5(a)(3)** of this rule are designated as salmonid waters and shall be protected for cold water fish. In addition to subsections (b) and (c), the following criteria are established to ensure conditions necessary for the maintenance of a well-balanced, cold water fish community and are applicable at any point in the waters outside of the applicable mixing zone:

(1) Dissolved oxygen concentrations shall not be less than six (6.0) milligrams per liter at any time and shall not be less than seven (7.0) milligrams per liter in areas where spawning occurs during the spawning season and in areas used for imprinting during the time salmonids are being imprinted. Dissolved oxygen concentrations in the open waters of Lake Michigan shall not be less than seven (7.0) milligrams per liter at any time.

(2) The maximum temperature rise above natural shall not exceed two **(2)** degrees Fahrenheit ~~(2°F)~~ (one and one-tenth ~~degree~~ **(1.1) degrees** Celsius) ~~(1.1°C))~~ at any time or place ~~nor,~~ **and,** unless due to natural causes, ~~shall~~ the temperature **shall not** exceed the following:

(A) Seventy **(70)** degrees Fahrenheit ~~(70°F)~~ (twenty-one and one-tenth **(21.1)** degrees Celsius) ~~(21.1°C))~~ at any time.

(B) Sixty-five **(65)** degrees Fahrenheit ~~(65°F)~~ (eighteen and three-tenths **(18.3)** degrees Celsius) ~~(18.3°C))~~ during spawning or imprinting periods.

(e) This subsection establishes bacteriological quality for recreational uses as follows:

(1) In addition to subsection (b), the criteria in this subsection shall be used **to:**

(A) ~~to~~ evaluate waters for full body contact recreational uses;

(B) ~~to~~ establish wastewater treatment requirements; and

(C) ~~to~~ establish effluent limits during the recreational season, which is defined as the months of April through October, inclusive.

(2) E. coli bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period ~~nor~~ **or** exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period.

(f) This subsection establishes surface water quality for **a** public water ~~supplies.~~ **supply.** In addition to subsection (b), the following ~~standards~~ **criteria** are established to protect the surface water quality at the point at which water is withdrawn for treatment for public supply:

(1) The coliform bacteria group shall not exceed the following:

(A) Five thousand (5,000) per one hundred (100) milliliters as a monthly average value (either MPN or MF count).

(B) Five thousand (5,000) per one hundred (100) milliliters in more than twenty percent (20%) of the samples examined during any month.

(C) Twenty thousand (20,000) per one hundred (100) milliliters in more than five percent (5%) of the samples examined during any month.

(2) Taste and odor producing substances, other than those naturally occurring, shall not interfere with the production of a finished water by conventional treatment consisting of coagulation, sedimentation, filtration, and disinfection.

(3) The concentrations of either chlorides or sulfates shall not exceed two hundred fifty (250) milligrams per liter unless due to naturally occurring sources.

(4) The concentration of dissolved solids shall not exceed seven hundred fifty (750) milligrams per liter other than due to naturally occurring sources. A specific conductance of one thousand two hundred (1,200) micromhos per centimeter (at twenty-five (25) degrees Celsius) may be considered equivalent to a dissolved solids concentration of seven hundred fifty (750) milligrams per liter.

~~(4)~~ **(5)** Surface waters shall be considered acceptable for **a** public ~~supplies~~ **water supply** if radium-226 and strontium-90 are present in amounts not exceeding three (3) and ten (10) picocuries per liter, respectively. In the known absence of strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed one thousand (1,000) picocuries per liter.

~~(5)~~ **(6)** The combined concentration of nitrate-N and nitrite-N shall not exceed ten (10) milligrams per liter, and the concentration of nitrite-N shall not exceed one (1) milligram per liter.

~~(6)~~ **(7)** Chemical constituents in the waters shall not be present in such levels as to prevent, after conventional treatment, meeting the drinking water standards contained in 327 IAC 8-2, due to other than natural causes.

(g) This subsection establishes **surface** water quality for industrial water supply. In addition to subsection (b), the ~~standard~~ **criterion** to ensure protection of water quality at the point at which water is withdrawn for use (either with or without treatment) for industrial cooling and processing is that, other than from naturally occurring sources, the dissolved solids shall not exceed seven hundred fifty (750) milligrams per liter at any time. A specific conductance of one thousand two hundred (1,200) micromhos per ~~centimeters~~ **centimeter** (at twenty-five **(25)** degrees Celsius) ~~(25°C))~~ may be considered equivalent to a dissolved solids concentration of seven hundred fifty (750) milligrams per liter.

(h) This subsection establishes **surface** water quality for agricultural uses. The ~~standards~~ **criteria** to ensure water quality conditions necessary for agricultural use are the same as those in subsection (b).

(i) This subsection establishes **surface** water quality for limited uses. The quality of waters designated for limited uses under section 19(a) of this rule shall, at a minimum, meet the following criteria:

(1) The criteria contained in subsection (b).

(2) The criteria contained in subsection (e).

(3) The criteria contained in subsection (g).

(4) The waters must be aerobic at all times.

(5) Notwithstanding subdivisions (1) through (4), the quality of a limited use stream at the point where it becomes physically or chemically capable of supporting a higher use or at its interface with a higher use water segment shall meet the criteria that are applicable to the higher use water.

(j) Additional requirements for the open waters of Lake Michigan are as follows:

(1) In addition to complying with all other applicable subsections, open waters in Lake Michigan shall meet the following criteria:

Table 8-9

Additional Criteria for Lake Michigan

Parameters	Criteria
Dissolved oxygen	Dissolved oxygen concentrations shall not be less than seven (7.0) milligrams per liter at any time at all places outside the applicable mixing zone.

pH	No pH values below six (6.0) ~~nor~~ **or** above nine (9.0), except daily fluctuations that exceed pH 9.0 and are correlated with photosynthetic activity, shall be permitted.

Chlorides	860 mg/l criterion maximum concentration
	230 mg/l criterion continuous concentration
Phenols	See subsection (c)(1)
Sulfates	250 mg/l[1]
Total phosphorus	See 327 IAC 5-10-2
Total dissolved solids	750 mg/l[1]
Fluorides	1.0 mg/l[1]
Dissolved iron	300 µg/l[1]

[1]The above-noted criteria are established to minimize or prevent increased levels of these substances in Lake Michigan. For the purposes of establishing water quality-based effluent limitations based on the above-noted criteria, they shall be treated as four (4) day average criteria.

(2) During each triennial review of the water quality standards, prior to preliminary adoption of revised rules, the department shall prepare a report for the board on the monitoring data for the constituents in the following table (Table 8-10), as measured at the drinking water intakes in Lake Michigan. If these data indicate that the levels of the constituents are either increasing or exceed the levels in the table, the report shall provide available information on the known and potential causes of the increased levels of these parameters, the known and

potential impacts on aquatic life, wildlife, and human health, and any recommended revisions of the criteria.

Table 8-10

Parameters	Levels
pH	7.5-8.5 s.u.
Chlorides	
Monthly average	15 mg/l
Daily maximum	20 mg/l
Sulfates	
Monthly average	26 mg/l
Daily maximum	50 mg/l
Total phosphorus	
Monthly average	0.03 mg/l
Daily maximum	0.04 mg/l
Total dissolved solids	
Monthly average	172 mg/l
Daily maximum	200 mg/l

~~(k) The following table is for reference only to facilitate the comparison of the former water quality criteria with water quality criteria developed using the methodologies within this rule; these former water quality criteria shall not be used to establish water quality-based permit limits:~~

~~Table 8-11~~

~~Substances~~	~~Acute Aquatic Life~~	~~Chronic Outside of Mixing Zone Chronic Aquatic Life~~	~~Chronic Outside of Mixing Zone Human Health~~	~~Chronic Point of Water Intake Human Health~~
~~Metals (µg/l)~~				
~~(Acid soluble, except as indicated)~~				
~~Antimony~~			~~45,000 (T)~~	~~146 (T)~~

Arsenic (III)			0.175 (C)	0.022 (C)
Barium				1,000 (D)
Beryllium			1.17 (C)	0.068 (C)
Cadmium				10 (D)
Chromium (III)			3,433,000 (T)	170,000 (T)
Chromium (VI)				50 (D)
Lead	$e^{(1.273\ [\ln Hard]-1.460)}$	$e^{(1.273\ [\ln Hard]-4.705)}$		50 (D)
Nickel			100 (T)	13.4 (T)
Selenium				10 (D)
Silver	$e^{(1.72[\ln Hard]-6.52)}/2$			50 (D)
Thallium			48 (T)	13 (T)
Organics (µg/l)				
Acrolein			780 (T)	320 (T)
Acrylonitrile			6.5 (C)	0.58 (C)
Aldrin	1.5		0.00079 (C)	0.00074 (C)
Benzidine			0.0053 (C)	0.0012 (C)
Carbon Tetrachloride			69.4 (C)	4.0 (C)
Chlordane	1.2	0.0043		
Chlorinated Benzenes				
1,2,4,5-Tetrachlorobenzene			48 (T)	38 (T)
Pentachlorobenzene			85 (T)	74 (T)
Hexachlorobenzene			0.0074 (C)	0.0072 (C)
Chlorinated Ethanes				
1,2-dichloroethane			2,430 (C)	9.4 (C)
1,1,1-trichloroethane			1,030,000 (T)	18,400 (T)
1,1,2-trichloroethane			418 (C)	6.0 (C)
1,1,2,2,-tetrachloroethane			107 (C)	1.7(C)
Chlorinated Phenols				
2,4,5-trichlorophenol				2,600 (T)
2,4,6-trichlorophenol			36 (C)	12 (C)
Chloroalkyl Ethers				
bis(2-chloroisopropyl) ether			4,360 (T)	34.7 (T)
bis(chloromethyl) ether			0.018 (C)	0.000038 (C)
bis(2-chloroethyl) ether			13.6 (C)	0.3 (C)
Chloroform			157 (C)	1.9 (C)
Chlorpyrifos	0.083	0.041		
DDT	0.55	0.001		
Dichlorobenzenes			2,600 (T)	400 (T)
Dichlorobenzidine			0.2 (C)	0.1 (C)
1,1-dichloroethylene			18.5 (C)	0.33 (C)

2,4-dichlorophenol				3,090 (T)
Dichloropropenes			14,100 (T)	87 (T)
2,4-dinitrotoluene			91 (C)	1.1 (C)
1,2-diphenylhydrazine			5.6 (C)	0.422 (C)
Endosulfan	0.11	0.056	159 (T)	74 (T)
Endrin				1.0 (D)
Ethylbenzene			3,280 (T)	1,400 (T)
Fluoranthene			54 (T)	42 (T)
Halomethanes			157 (C)	1.9 (C)
Heptachlor	0.26	0.0038	0.0028 (C)	0.0028 (C)
Hexachlorobutadiene			500 (C)	4.47 (C)
Hexachlorocyclohexane (HCH)				
alpha HCH			0.31 (C)	0.09 (C)
beta HCH			0.55 (C)	0.16 (C)
gamma HCH (Lindane)	1.0	0.08	0.63 (C)	0.19 (C)
Technical HCH			0.41 (C)	0.12 (C)
Hexachlorocyclopentadiene				206 (T)
Isophorone			520,000 (T)	5,200 (T)
Nitrobenzene				19,800 (T)
4,6-dinitro-o-cresol			765 (T)	13.4 (T)
Nitrosamines				
N-nitrosodiethylamine			12.4 (C)	0.008 (C)
N-nitrosodimethylamine			160 (C)	0.014 (C)
N-nitrosodibutylamine			5.9 (C)	0.064 (C)
N-nitrosodiphenylamine			161 (C)	49 (C)
N-nitrosopyrrolidine			919 (C)	0.16 (C)
Pentachlorophenol				1,000 (T)
Phenol				3,500 (T)
Phthalate Esters				
Dimethyl phthalate			2,900,000 (T)	313,000 (T)
Diethyl phthalate			1,800,000 (T)	350,000 (T)
Dibutyl phthalate			154,000 (T)	34,000 (T)
Di-2-ethylhexyl phthalate			50,000 (T)	15,000 (T)
Polychlorinated Biphenyls (PCBs)		0.014	0.00079 (C)	0.00079 (C)
Carcinogenic Polynuclear Aromatic Hydrocarbons (PAHs)			0.31 (C)	0.028 (C)
Tetrachloroethylene			88.5 (C)	8 (C)
Toxaphene	0.73	0.0002		
Vinyl Chloride			5,246 (C)	20 (C)
Other Substances				

Asbestos (fibers/liter)	300,000 (C)
Nitrate-N + Nitrite-N (mg/l)	10 (D)
Nitrite-N (mg/l)	1.0 (D)

Dissolved solids shall not exceed 750 mg/l in all waters.

Fluoride shall not exceed 2.0 mg/l in all waters.

Sulfates shall not exceed 250 mg/l in all waters.

NOTES:

(T) derived from threshold toxicity.

(C) derived from nonthreshold cancer risk.

(D) derived from drinking water standards, equal to or less than threshold toxicity.

(l) The department shall calculate additional criteria or values as follows:

(1) The department shall calculate Tier I criteria or Tier II values (Tier I criteria will be calculated whenever sufficient data are available) using the methodologies under sections 11 through 15 of this rule, and shall publish them in the Indiana Register by July 1, 1997, for the following parameters:

Table 8-12

Parameter	Criteria or Values to be Calculated
Acenaphthene	Aquatic life and human health
Acenaphthylene	Aquatic life[††] and human health[††]
Aldrin	Aquatic life, human health, and wildlife
Aluminum	Aquatic life and human health
Anthracene	Aquatic life and human health
Arsenic	Human health
Benzene	Aquatic life
Benzo(a)anthracene	Aquatic life and human health[††]
Benzo(a)Pyrene	Aquatic life and human health[††]
Benzo(b)fluoranthene	Aquatic life and human health[††]
bis(2-ethylhexyl) phthalate	Aquatic life and human health
Cadmium	Human health
Chloroform	Aquatic life and human health
Chromium, Trivalent	Human health
Chromium, Hexavalent	Human health
Chrysene	Aquatic life[††] and human health[††]
DDT	Aquatic life
Dibenzofuran	Aquatic life and human health
Ethylbenzene	Aquatic life and human health
Ethylene glycol	Aquatic life and human health
Fluoranthene	Aquatic life and human health
Fluorene	Aquatic life and human health
Fluoride	Aquatic life and human health[††]
Iron	Aquatic life

~~Lead~~	~~Aquatic life and human health~~
~~Manganese~~	~~Aquatic life and human health~~
~~2-Methylnaphthalene~~	~~Aquatic life[††] and human health~~
~~Methylene chloride~~	~~Aquatic life~~
~~Methyl tert-Butyl Ether~~	~~Aquatic life and human health~~
~~Naphthalene~~	~~Aquatic life and human health~~
~~Nickel~~	~~Human health~~
~~Phenanthrene~~	~~Aquatic life and human health~~
~~Pyrene~~	~~Aquatic life[††] and human health~~
~~Selenium~~	~~Acute aquatic life and human health~~
~~Silver~~	~~Aquatic life and human health~~
~~Tetrachloroethylene~~	~~Aquatic life and human health~~
~~Toluene~~	~~Aquatic life~~
~~1,1,1-Trichloroethane~~	~~Aquatic life and human health~~
~~1,3,5-Trimethylbenzene~~	~~Aquatic life[††] and human health~~
~~Xylene~~	~~Aquatic life[††] and human health~~

~~[††]For the above-noted criteria, insufficient data are available to calculate Tier I criteria and Tier II values at this time. Unless data become available by May 1, 1997, IDEM may not be able to develop the above-noted criteria by July 1, 1997.~~

~~(2) By July 1, 1997, the department shall develop a schedule for determining criteria or values for the parameters that have criteria under 327 IAC 2-1-6, Table 1 that do not have criteria in this rule and for which criteria or values have not been calculated under subdivision (1).~~

(Water Pollution Control Board; 327 IAC 2-1.5-8; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1370; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3376)

SECTION 16. 327 IAC 2-1.5-10 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-10 Methods of analysis

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4

Sec. 10. The analytical procedures used as methods of analysis to determine the chemical, bacteriological, biological, and radiological quality of waters sampled shall be in accordance with 40 CFR 136 ~~Standard Methods for the Examination of Water and Wastewater,~~ or methods approved by the commissioner. *(Water Pollution Control Board; 327 IAC 2-1.5-10; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1381)*

SECTION 17. 327 IAC 2-1.5-11 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-11 Determination of Tier I aquatic life criteria

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18

Sec. 11. (a) The procedures in this section shall be used to determine acute and chronic Tier I aquatic life criteria.

(b) The following considerations regarding the toxic substance shall be considered during the development of **Tier I** criteria or **Tier II** values:

(1) Each separate chemical that does not ionize substantially in most natural bodies of water should usually be considered a separate substance, except possibly for structurally similar organic compounds that only exist in large quantities as commercial mixtures of the various compounds and apparently have similar biological, chemical, physical, and toxicological properties.

(2) For chemicals that ionize substantially in most natural bodies of water, for example:

(A) some phenols and organic acids;

(B) some salts of phenols and organic acids; and

(C) most inorganic salts and coordination complexes of metals and metalloid;

all forms that would be in chemical equilibrium should usually be considered one (1) substance. Each different oxidation state of a metal and each different nonionizable covalently bonded organometallic compound should usually be considered a separate substance.

(3) The definition of the toxic substance should include an operational analytical component. Identification of a substance simply as sodium, for example, implies total sodium, but leaves room for doubt. If total is meant, it must be explicitly stated. Even total has different operational definitions, some of which do not necessarily measure all that is there in all samples. Thus, it is also necessary to reference or describe the analytical method that is intended. The selection of the operational analytical component should take into account the analytical and environmental chemistry of the material and various practical considerations, such as labor and equipment requirements, and whether the method would require measurement in the field or would allow measurement after samples are transported to a laboratory.

(A) The primary requirements of the operational analytical component shall be as follows:

(i) Appropriate for use on samples of receiving water.

(ii) Rarely result in underprotection or overprotection of aquatic organisms and their uses.

(iii) Compatible with the available toxicity and bioaccumulation data without making extrapolations that are too hypothetical. Toxicity is the property of a substance, or combination of substances, to adversely affect organisms.

(B) Because an ideal analytical measurement will rarely be available, an appropriate compromise measurement will usually have to be used. This compromise measurement must fit with the general approach that if an ambient concentration is lower than the criterion **or value,** unacceptable effects will probably not occur, that is, the compromise measure must not err on the side of underprotection when measurements are made on a surface water. What is an appropriate measurement in one (1) situation might not be appropriate for another. For example, because the chemical and physical properties of an effluent are usually quite different from those of the receiving water, an analytical method that is appropriate for analyzing an effluent might not be appropriate for expressing a criterion **or value,** and vice versa. A criterion **or value** should be based on an appropriate analytical measurement, but the criterion **or value** is not rendered useless if an ideal measurement either is not available or is not feasible. The analytical chemistry of the substance might have to be taken into account when defining the substance or when judging the acceptability of some toxicity tests, but a criterion **or value** must not be based on the sensitivity of an analytical method. When aquatic organisms are more sensitive than routine analytical methods, the proper solution is to develop better analytical methods.

(4) The use of dissolved metal to set and measure compliance with water quality standards for aquatic life is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. ~~One (1) reason is that a primary mechanism for water column toxicity is adsorption at the gill surface that requires metals to be in the dissolved form.~~ Reasons for the consideration of total recoverable metals criteria **or values** include risk management considerations not covered by evaluation of water column toxicity. The commissioner may, after considering sediment and food chain effects for a particular metal, decide to take a more conservative approach for the metal. ~~since metals are elements, hence persistent.~~ This approach could include the ~~use~~ **expression of aquatic life criteria or values for the metal in the form** of total recoverable metal. ~~in the development of a water quality criterion for a specific metal.~~ **If the commissioner determines that it is appropriate to express aquatic life criteria or values for a particular metal in the form of dissolved metal, the criteria or values shall be determined as follows:**

(A) If sufficient toxicological data in the form of dissolved metal are available, these data shall be used in sections 11, 12, and 16 of this rule to derive aquatic life criteria or values directly in the form of dissolved metal.

(B) If sufficient toxicological data in the form of dissolved metal are not available, aquatic life criteria or values shall be derived in the form of total recoverable metal using the procedures in sections 11, 12, and 16 of this rule and then multiplied by criteria conversion factors approved by the commissioner to express the criteria or values in the form of dissolved metal.

(C) If sufficient toxicological data in the form of dissolved metal are not available and criteria conversion factors for the particular metal have not been approved by the commissioner, aquatic life criteria or values shall be derived in the

form of total recoverable metal using the procedures in sections 11, 12 and 16 of this rule and expressed in the form of total recoverable metal.

(c) The following data collection procedures shall be followed when developing Tier I aquatic life criteria:

(1) Collect all data available on the substance concerning toxicity to aquatic animals and plants.

(2) All data that are used should be available in typed, dated, and signed hard copy, for example:

(A) publication;

(B) manuscript;

(C) letter; or

(D) memorandum;

with enough supporting information to indicate that acceptable test procedures were used and that the results are reliable. In some cases, it may be appropriate to obtain written information from the investigator, if possible. Information that is not available for distribution shall not be used.

(3) Questionable data, whether published or unpublished, shall not be used. For example, data shall be rejected if they are from tests:

(A) that did not contain a control treatment;

(B) in which too many organisms in the control treatment died or showed signs of stress or disease; and

(C) in which distilled or deionized water was used as the dilution water without the addition of appropriate salts.

(4) Data on technical grade materials may be used if appropriate, but data on formulated mixtures and emulsifiable concentrates of the material shall not be used.

(5) For some highly volatile, hydrolyzable, or degradable materials, it may be appropriate to use only results of flow-through tests in which the concentrations of test material in test solutions were measured using acceptable analytical methods. A flow-through test is a test with aquatic organisms in which test solutions flow into constant-volume test chambers either intermittently, for example, every few minutes, or continuously, with the excess flowing out.

(6) Data shall be rejected if obtained using the following:

(A) Brine shrimp, because they usually only occur naturally in water with salinity greater than thirty-five (35) grams per kilogram.

(B) Species that do not have reproducing wild populations in North America.

(C) Organisms that were previously exposed to substantial concentrations of the test material or other contaminants.

(D) Saltwater species except for use in deriving acute-chronic ratio (ACR).

(7) Questionable data, data on formulated mixtures and emulsifiable concentrates, and data obtained with species nonresident to North America or previously exposed organisms may be used to provide auxiliary information but shall not be used in the derivation of criteria.

(d) This subsection establishes the data requirements for the development of Tier I aquatic life criteria as follows:

(1) Certain data should be available to help ensure that each of the major kinds of possible adverse effects receives adequate consideration. An adverse effect is a change in an organism that is harmful to the organism. Exposure means contact with a chemical or physical agent. Results of acute and chronic toxicity tests with representative species of aquatic animals are necessary so that data available for tested species can be considered a useful indication of the sensitivities of appropriate untested species. Fewer data concerning toxicity to aquatic plants are usually available because procedures for conducting tests with plants and interpreting the results of such tests are not as well developed.

(2) To derive a ~~Great Lakes~~ Tier I criterion for aquatic organisms and their uses, the following must be available:

(A) Results of acceptable acute (or chronic) tests (see subsections (e) and (g)) with at least one (1) species of freshwater animal in at least eight (8) different families such that all of the following are included:

(i) The family Salmonidae in the class Osteichthyes.

(ii) One (1) other family (preferably a commercially or recreationally important, warmwater species) in the class Osteichthyes, for example:

(AA) bluegill; or

(BB) channel catfish.

(iii) A third family in the phylum Chordata, for example:

(AA) fish; or

(BB) amphibian.

(iv) A planktonic crustacean, for example:

(AA) a cladoceran; or

(BB) copepod.

(v) A benthic crustacean, for example:

(AA) ostracod;

(BB) isopod;

(CC) amphipod; or

(DD) crayfish.

(vi) An insect, for example:

(AA) mayfly;

(BB) dragonfly;

(CC) damselfly;

(DD) stonefly;

(EE) caddisfly;

(FF) mosquito; or

(GG) midge.

(vii) A family in a phylum other than Arthropoda or Chordata, for example:

(AA) Rotifera;

(BB) Annelida; or

(CC) Mollusca.

(viii) A family in any order of insect or any phylum not already represented.

(B) Acute-chronic ratios (see subsection (g)) with at least one (1) species of aquatic animal in at least three (3) different families provided that of the three (3) species **at least one (1) is:**

(i) ~~at least one (1) is~~ a fish;

(ii) ~~at least one (1) is~~ an invertebrate; and

(iii) ~~at least one (1) species is~~ an acutely sensitive freshwater species (the other two (2) may be saltwater species).

(C) Results of at least one (1) acceptable test with a freshwater algae or vascular plant is desirable but not required for criterion derivation (see subsection (i)). If plants are among the aquatic organisms most sensitive to the material, results of a test with a plant in another phylum (division) should also be available.

(3) If all required data are available, a numerical criterion can usually be derived except in special cases. For example, derivation of a chronic criterion might not be possible if the available ACRs vary by more than a factor of ten (10) with no apparent pattern. Also, if a criterion is to be related to a water quality characteristic (see subsections (f) and (h)), more data will be required.

(4) Confidence in a criterion usually increases as the amount of available pertinent information increases. Thus, additional data are usually desirable.

(e) The following procedures shall be used to calculate a final acute value (FAV):

(1) Appropriate measures of the acute (short term) toxicity of the material to a variety of species of aquatic animals are used to calculate the FAV. The calculated FAV is a calculated estimate of the concentration of a test material such that ninety-five percent (95%) of the genera (with which acceptable acute toxicity tests have been conducted on the material) have higher genus mean acute values (GMAVs). An acute test is a comparative study in which organisms that are subjected to different treatments are observed for a short period usually not constituting a substantial portion of their life span. However, in some cases, the species mean acute value (SMAV) of a commercially or recreationally important species of the Great Lakes system is lower than the calculated FAV, then the SMAV replaces the calculated FAV in order to provide protection for that important species.

(2) Acute toxicity tests shall be conducted in accordance with this subsection.

(3) Except for results with saltwater annelids and mysids, results of acute tests during which the test organisms were fed should

not be used, unless data indicate that the food did not affect the toxicity of the test material. (If the minimum acute-chronic ratio data requirements (as described in subsection (d)(2)(B)) are not met with freshwater data alone, saltwater data may be used.)

(4) Results of acute tests conducted in unusual dilution water, for example, dilution water in which total organic carbon or particulate matter exceeded five (5) milligrams per liter, shall not be used, unless a relationship is developed between acute toxicity and organic carbon or particulate matter or unless data show that the organic carbon or particulate matter do not affect toxicity.

(5) Acute values must be based upon endpoints ~~which~~ **that** reflect the total severe adverse impact of the test material on the organisms used in the test. Therefore, only the following kinds of data on acute toxicity to aquatic animals shall be used:

(A) Tests with daphnids and other cladocerans must be started with organisms less than twenty-four (24) hours old, and tests with midges must be started with second or third instar larvae. It is preferred that the results should be the forty-eight (48) hour EC_{50} based on the total percentage of organisms killed and immobilized. If such an EC_{50} is not available for a test, the forty-eight (48) hour LC_{50} should be used in place of the desired forty-eight (48) hour EC_{50}. An EC_{50} or LC_{50} of longer than forty-eight (48) hours can be used as long as the animals were not fed and the control animals were acceptable at the end of the test.

(B) It is preferred that the results of a test with embryos and larvae of barnacles, bivalve molluscs (clams, mussels, oysters, and scallops), sea urchins, lobsters, crabs, shrimp, and abalones be the ninety-six (96) hour EC_{50} based on the percentage of organisms with incompletely developed shells plus the percentage of organisms killed. If such an EC_{50} is not available from a test, of the values that are available from the test, the lowest of the following should be used in place of the desired ninety-six (96) hour EC_{50}:

(i) Forty-eight (48) to ninety-six (96) hour EC_{50}s based on percentage of organisms with incompletely developed shells plus percentage of organisms killed.

(ii) Forty-eight (48) to ninety-six (96) hour EC_{50}s based upon percentage of organisms with incompletely developed shells.

(iii) Forty-eight (48) hour to ninety-six (96) hour LC_{50}s.

If the minimum acute-chronic ratio data requirements (as described in subsection (d)(2)(B)) are not met with freshwater data alone, saltwater data may be used.

(C) It is preferred that the result of tests with all other aquatic animal species and older life stages of barnacles, bivalve molluscs (clams, mussels, oysters, and scallops), sea urchins, lobsters, crabs, shrimp, and abalones be the ninety-six (96) hour EC_{50} based on percentage of organisms exhibiting loss of equilibrium plus percentage of organisms immobilized plus percentage of organisms killed. If such an EC_{50} is not available from a test, of the values that are available from a test, the lower of the following should be used in place of the desired ninety-six (96) hour EC_{50}:

(i) The ninety-six (96) hour EC_{50} based on percentage of organisms exhibiting loss of equilibrium plus percentage of organisms immobilized.

(ii) The ninety-six (96) hour LC_{50}.

(D) Tests results that take into account the number of young produced, such as most tests with protozoans, are not considered acute tests, even if the duration was ninety-six (96) hours or less.

(E) If the tests were conducted properly, acute values reported as greater than values and those that are above the solubility of the test material should be used, because rejection of such acute values would bias the final acute value by eliminating acute values for resistant species.

(6) If the acute toxicity of the material to aquatic animals has been shown to be related to a water quality characteristic, such as hardness or particulate matter for freshwater animals, refer to subsection (f).

(7) The agreement of the data within and between species must be considered. Acute values that appear to be questionable in comparison with other acute and chronic data for the same species and for other species in the same genus must not be used. For example, if the acute values available for a species or genus differ by more than a factor of ten (10), rejection of some or all of the values would be appropriate, absent countervailing circumstances.

(8) If the available data indicate that one (1) or more life stages are at least a factor of two (2) more resistant than one (1) or more other life stages of the same species, the data for the more resistant life stages shall not be used in the calculation of the SMAV because a species cannot be considered protected from acute toxicity if all of the life stages are not protected.

(9) For each species for which at least one (1) acute value is available, the SMAV shall be calculated as the geometric mean of the results of all acceptable flow-through acute toxicity tests in which the concentrations of test material were measured with the most sensitive tested life stage of the species. For a species for which no such result is available, the SMAV shall be calculated as the geometric mean of all acceptable acute toxicity tests with the most sensitive tested life stage, for example, results of flow-through tests in which the concentrations were not measured and results of static and renewal tests based on initial concentrations (nominal concentrations are acceptable for most test materials if measured concentrations are not available) of test material. A

renewal test is a test with aquatic organisms in which either the test solution in a test chamber is removed and replaced at least once during the test or the test organisms are transferred into a new test solution of the same composition at least once during the test. A static test is a test with aquatic organisms in which the solution and organisms that are in a test chamber at the beginning of the test remain in the chamber until the end of the test, except for removal of dead test organisms. The following conditions are applicable to this calculation:

(A) Data reported by original investigators must not be rounded off. Results of all intermediate calculations must not be rounded off to fewer than four (4) significant digits.

(B) The geometric mean of N numbers is the Nth root of the product of the N numbers. Alternatively, the geometric mean can be calculated by adding the logarithms of the N numbers, dividing the sum by N, and taking the antilog of the quotient. The geometric mean of two (2) numbers is the square root of the product of the two (2) numbers, and the geometric mean of one (1) number is that number. Either natural (base e) or common (base 10) logarithms can be used to calculate geometric means as long as they are used consistently within each set of data, for example, the antilog used must match the logarithms used.

(C) Geometric means, rather than arithmetic means, are used here because the distributions of sensitivities of individual organisms in toxicity tests on most materials and the distributions of sensitivities of species within a genus are more likely to be lognormal than normal. Similarly, geometric means are used for ACRs because quotients are likely to be closer to lognormal than normal distributions. In addition, division of the geometric mean of a set of numerators by the geometric mean of the set of denominators will result in the geometric mean of the set of corresponding quotients.

(10) For each genus for which one (1) or more SMAVs are available, the GMAV shall be calculated as the geometric mean of the SMAVs available for the genus.

(11) Order the GMAVs from high to low.

(12) Assign ranks, R, to the GMAVs from "1" for the lowest to "N" for the highest. If two (2) or more GMAVs are identical, assign them successive ranks.

(13) Calculate the cumulative probability, P, for each GMAV as R/(N + 1).

(14) Select the four (4) GMAVs which have cumulative probabilities closest to five-hundredths (0.05) (if there are fewer than fifty-nine (59) GMAVs, these will always be the four (4) lowest GMAVs).

(15) Using the four (4) selected GMAVs and Ps, calculate:

(A) $FAV = e^{A}$

(B) $A = S(\sqrt{0.05}) + L$

(C) $L = \frac{\sum(\ln GMAV) - S(\sum(\sqrt{P}))}{4}$

(D) $S^2 = \frac{\sum((\ln GMAV)^2) - \frac{(\sum(\ln GMAV))^2}{4}}{\sum(P) - \frac{(\sum(\sqrt{P}))^2}{4}}$

(16) If for a commercially or recreationally important species of the Great Lakes system the geometric mean of the acute values from flow-through tests in which the concentrations of test material were measured is lower than the calculated FAV, then that geometric mean must be used as the FAV instead of the calculated FAV.

(f) When enough data are available to show that acute toxicity to two (2) or more species is similarly related to a water quality characteristic, the relationship shall be taken into account as described in subdivisions (1) through (6) or using analysis of covariance. The two (2) methods are equivalent and produce identical results. The manual method described in this subsection provides an understanding of this application of covariance analysis, but computerized versions of covariance analysis are much more convenient for analyzing large data sets. If two (2) or more factors affect toxicity, multiple regression analysis shall be used. An acute criterion based on a water quality characteristic shall be determined as follows:

(1) For each species for which comparable acute toxicity values are available at two (2) or more different values of the water quality characteristic, perform a least squares regression of the acute toxicity values on the corresponding values of the water quality characteristic to obtain the slope and its ninety-five percent (95%) confidence limits for each species. (Because the best documented relationship is that between hardness and acute toxicity of metals in fresh water and a log-log relationship fits these data, geometric means and natural logarithms of both toxicity and water quality are used in the rest of this section. For relationships based on other water quality characteristics, such as pH, temperature, no transformation or a different transformation

might fit the data better, and appropriate changes will be necessary throughout this section.)

(2) Decide whether the data for each species are relevant, taking into account the range and number of the tested values of the water quality characteristic and the degree of agreement within and between species. For example, a slope based on six (6) data points might be of limited value if it is based only on data for a very narrow range of values of the water quality characteristic. A slope based on only two (2) data points, however, might be useful if it is consistent with other information and if the two (2) points cover a broad enough range of the water quality characteristic. In addition, acute values that appear to be questionable in comparison with other acute and chronic data available for the same species and for other species in the same genus should not be used. For example, if after adjustment for the water quality characteristic, the acute values available for a species or genus differ by more than a factor of ten (10), rejection of some or all of the values would be appropriate, absent countervailing justification. If useful slopes are not available for at least one (1) fish and one (1) invertebrate or if the available slopes are too dissimilar or if too few data are available to adequately define the relationship between acute toxicity and the water quality characteristic, return to subsection (e)(7), using the results of tests conducted under conditions and in waters similar to those commonly used for toxicity tests with the species.

(3) For each species, calculate the geometric mean of the available acute values and then divide each of the acute values for the species by the geometric mean for the species. This normalizes the acute values so that the geometric mean of the normalized values for each species individually and for any combination of species is one (1.0).

(4) Similarly normalize the values of the water quality characteristic for each species individually using the procedure in subdivisions (1) through (3).

(5) Individually for each species perform a least squares regression of the normalized acute values of the water quality characteristic. The resulting slopes and ninety-five percent (95%) confidence limits will be identical to those obtained in subdivision (1). If, however, the data are actually plotted, the line of best fit for each individual species will go through the point 1,1 in the center of the graph.

(6) Treat all of the normalized data as if they were all for the same species and perform a least squares regression of all of the normalized acute values on the corresponding normalized values of the water quality characteristic to obtain the pooled acute slope, V, and its ninety-five percent (95%) confidence limits. If all of the normalized data are actually plotted, the line of best fit will go through the point 1,1 in the center of the graph.

(7) For each species calculate the geometric mean, W, of the acute toxicity values and the geometric mean, X, of the values of the water quality characteristic. (These were calculated in subdivisions (3) and (4)).

(8) For each species, calculate the logarithm, Y, of the SMAV at a selected value, Z, of the water quality characteristic using the equation:

$$Y = \ln W - V(\ln X - \ln Z)$$

(9) For each species calculate the SMAV at Z using the equation:

$$SMAV = e^{Y}$$

(10) Alternatively, the SMAVs at Z can be obtained by skipping the step in subdivision (7), using the equations in subdivisions (8) and (9) to adjust each acute value individually to Z, and then calculating the geometric mean of the adjusted values for each species individually. This alternative procedure allows an examination of the range of the adjusted acute values for each species.

(11) Obtain the FAV at Z by using the procedure described in subsection (e)(10) through (e)(15).

(12) If, for a commercially or recreationally important species of the Great Lakes system the geometric mean of the acute values at Z from flow-through tests in which the concentrations of the test material were measured is lower than the FAV at Z, then the geometric mean must be used as the FAV instead of the FAV calculated in subdivision (11).

(13) The final acute equation is written as:

$$(FAV) = e^{(V[\ln(\text{water quality characteristic})] + A - V[\ln Z])}$$

Where: V = pooled acute slope.

A = ln(FAV at Z).

Because V, A, and Z are known, the FAV can be calculated for any selected value of the water quality characteristic.

(g) The following procedures shall be used to calculate a final chronic value (FCV):

(1) Depending on the data that are available concerning chronic toxicity to aquatic animals, the FCV can be calculated in the same manner as the FAV or by dividing the FAV by the final acute-chronic ratio (FACR). In some cases, it might not be possible to

calculate a FCV. The FCV is one (1) of the following as applicable:

(A) A calculated estimate of the concentration of a test material such that ninety-five percent (95%) of the genera (with which acceptable chronic toxicity tests have been conducted on the material) have higher GMCVs.

(B) The quotient of an FAV divided by an appropriate ACR (ACR is a way of relating acute and chronic toxicities).

(C) The SMCV of an important or critical species, if the SMCV is lower than the calculated estimate or the quotient.

(2) Chronic values shall be based on results of flow-through (except renewal is acceptable for daphnids) chronic tests in which the concentrations of test material in the test solutions were properly measured at appropriate times during the test. A chronic test is a comparative study in which organisms, that are subjected to different treatments, are observed for a long period or a substantial portion of their life span.

(3) Results of chronic tests in which survival, growth, or reproduction in the control treatment was unacceptably low shall not be used. The limits of acceptability will depend on the species.

(4) Results of chronic tests conducted in unusual dilution water, for example, dilution water in which total organic carbon or particulate matter exceeded five (5) milligrams per liter, should not be used, unless a relationship is developed between chronic toxicity and organic carbon or particulate matter or unless data show that the organic carbon or particulate matter do not affect toxicity.

(5) Chronic values must be based on endpoints and lengths of exposure appropriate to the species. Therefore, only results of the following kinds of chronic toxicity tests shall be used:

(A) Life-cycle toxicity tests consisting of exposures of each of two (2) or more groups of individuals of a species to a different concentration of the test material throughout a life cycle. To ensure that all life stages and life processes are exposed, the following procedures shall be followed:

(i) Tests with fish should begin with embryos or newly hatched young less than forty-eight (48) hours old, continue through maturation and reproduction, and should end not less than twenty-four (24) days (ninety (90) days for salmonids) after the hatching of the next generation. For fish, data should be obtained and analyzed on survival and growth of adults and young, maturation of males and females, eggs spawned per female, embryo viability (salmonids only), and hatchability.

(ii) Tests with daphnids should begin with young less than twenty-four (24) hours old and last for not less than twenty-one (21) days, and for ceriodaphnids not less than seven (7) days. For daphnids, data should be obtained and analyzed on survival and young per female.

(iii) Tests with mysids should begin with young less than twenty-four (24) hours old and continue until seven (7) days past the median time of first brood release in the controls. For mysids, data should be obtained and analyzed on survival, growth, and young per female.

(B) Partial life-cycle toxicity tests consist of exposures of each of two (2) or more groups of individuals of a species of fish to a different concentration of the test material through most portions of a life cycle. Partial life-cycle tests are allowed with fish species that require more than a year to reach sexual maturity, so that all major life stages can be exposed to the test material in less than fifteen (15) months. A life-cycle test is a comparative study in which organisms that are subjected to different treatments are observed at least from a life stage in one (1) generation to the same life-stage in the next generation. Exposure to the test material should begin with immature juveniles at least two (2) months prior to active gonad development, continue through maturation and reproduction, and end not less than twenty-four (24) days (ninety (90) days for salmonids) after the hatching of the next generation. Data should be obtained and analyzed on survival and growth of adults and young, maturation of males and females, eggs spawned per female, embryo viability (salmonids only), and hatchability.

(C) Early life-stage toxicity tests consisting of twenty-eight (28) to thirty-two (32) day (sixty (60) days post hatch for salmonids) exposures of the early life stages of a species of fish from shortly after fertilization through embryonic, larval, and early juvenile development. Data should be obtained and analyzed on survival and growth. (Note: Results of an early life-stage test are used as predictions of results of life-cycle and partial life-cycle tests with the same species. Therefore, when results of a life-cycle or partial life-cycle test are available, results of an early life-stage test with the same species should not be used. Also, results of early life-stage tests in which the incidence of mortalities or abnormalities increased substantially near the end of the test shall not be used because the results of such tests are possibly not good predictions of comparable life-cycle or partial life-cycle tests.)

(6) A chronic value may be obtained by analyzing chronic data using regression analysis or by calculating the geometric mean of the lower and upper chronic limits from a chronic test as follows:

(A) A lower chronic limit is the highest tested concentration:

(i) in an acceptable chronic test;

(ii) ~~which~~ **that** did not cause an unacceptable amount of adverse effect on any of the specified biological measurements; and

(iii) below which no tested concentration caused an unacceptable effect.

(B) An upper chronic limit is the lowest tested concentration:

(i) in an acceptable chronic test;

(ii) ~~which~~ **that** did cause an unacceptable amount of adverse effect on one (1) or more of the specified biological measurements; and

(iii) above which all tested concentrations also caused such an effect.

(C) Because various authors have used a variety of terms and definitions to interpret and report results of chronic tests, reported results should be reviewed carefully. The amount of effect that is considered unacceptable is often based on a statistical hypothesis test, but might also be defined in terms of a specified percent reduction from the controls. A small percent reduction (for example, three percent (3%)) might be considered acceptable even if it is statistically significantly different from the control, whereas a large percent reduction (for example, thirty percent (30%)) might be considered unacceptable even if it is not statistically significant.

(7) If the chronic toxicity of the material to aquatic animals has been shown to be related to a water quality characteristic, such as hardness or particulate matter for freshwater animals, refer to subsection (h).

(8) If chronic values are available for species in eight (8) families as described in subsection (d)(2)(A), a SMCV shall be calculated for each species for which at least one (1) chronic value is available by calculating the geometric mean of the results of all acceptable life-cycle and partial life-cycle toxicity tests with the species; for a species of fish for which no such result is available, the SMCV is the geometric mean of all acceptable early life-stage tests. Appropriate GMCVs shall also be calculated. A GMCV is the geometric mean of the SMCVs for the genus. The FCV shall be obtained using the procedure described in subsection (e)(10) through (e)(15), substituting SMCV and GMCV for SMAV and GMAV, respectively. See subdivision (10).

(9) The following procedures are for use when chronic values are not available for species in eight (8) taxonomic families as described in subsection (d)(2)(A):

(A) For each chronic value for which at least one (1) corresponding appropriate acute value is available, calculate an ACR, using for the numerator the geometric mean of the results of all acceptable flow-through (except static is acceptable for daphnids and midges) acute tests in the same dilution water in which the concentrations are measured. For fish, the acute tests should be conducted with juveniles. The acute tests should be part of the same study as the chronic test. If acute tests were not conducted as part of the same study, but were conducted as part of a different study in the same laboratory and dilution water, then they may be used. If no such acute tests are available, results of acute tests conducted in the same dilution water in a different laboratory may be used. If no such acute tests are available, an ACR shall not be calculated.

(B) For each species, calculate the SMACR as the geometric mean of all ACRs available for that species. If the minimum ACR data requirements (as described in subsection (d)(2)(B)) are not met with freshwater data alone, saltwater data may be used along with the freshwater data.

(C) For some materials, the ACR seems to be the same for all species, but for other materials the ratio seems to increase or decrease as the SMAV increases. Thus the FACR can be obtained in the following three (3) ways, depending on the data available (If the available SMACRs do not fit one (1) of these cases, a FACR may not be obtained and a Tier I FCV probably cannot be calculated.):

(i) If the species mean ACR seems to increase or decrease as the SMAVs increase, the FACR shall be calculated as the geometric mean of the ACRs for species whose SMAVs are close to the FAV.

(ii) If no major trend is apparent and the ACRs for all species are within a factor of ten (10), the FACR shall be calculated as the geometric mean of all of the SMACRs.

(iii) If the most appropriate SMACRs are less than two (2.0), and especially if they are less than one (1.0), acclimation has probably occurred during the chronic test. In this situation, because continuous exposure and acclimation cannot be assured to provide adequate protection in field situations, the FACR should be assumed to be two (2), so that the FCV is equal to the Criterion Maximum Concentration (CMC). (See subsection (k)(1).)

(D) Calculate the FCV by dividing the FAV by the FACR. FCV = FAV ÷ FACR. If there is a final acute equation rather than a FAV, see also subsection (f).

(10) If the SMCV of a commercially or recreationally important species of the Great Lakes system is lower than the calculated FCV, then that SMCV must be used as the FCV instead of the calculated FCV.

(h) When enough data are available to show that toxicity to two (2) or more species is similarly related to a water quality characteristic, the relationship shall be taken into account as described in this subsection. A final chronic equation can be derived

in two (2) ways. The procedure described in subdivision (1) will result in the chronic slope being the same as the acute slope. The procedure described in subdivision (2) will usually result in the chronic slope being different from the acute slope. A chronic criterion based on a water quality characteristic shall be determined as follows:

(1) If ACRs are available for enough species at enough values of the water quality characteristic to indicate that the ACR appears to be the same for all species and appears to be independent of the water quality characteristic, then:

(A) calculate the FACR as the geometric mean of the available SMACRs;

(B) calculate the FCV at the selected value Z of the water quality characteristic by dividing the FAV at Z (see subsection (f)(11)) by the FACR; and

(C) use V = pooled acute slope (see subsection (f)(6)), and L = pooled chronic slope (see subdivision (2)(F)).

(2) When enough data are available to show that chronic toxicity to at least one (1) species is related to a water quality characteristic, the relationship should be taken into account as described in clauses (A) through (E) or using analysis of covariance. The two (2) methods are equivalent and produce identical results. The manual method described in this subdivision provides an understanding of this application of covariance analysis, but computerized versions of covariance analysis are much more convenient for analyzing large data sets. If two (2) or more factors affect toxicity, multiple regression analysis shall be used.

(A) For each species for which comparable chronic toxicity values are available at two (2) or more different values of the water quality characteristic, perform a least squares regression of the chronic toxicity values on the corresponding values of the water quality characteristic to obtain the slope and its ninety-five percent (95%) confidence limits for each species. (Because the best documented relationship is that between hardness and acute toxicity of metals in fresh water and a log-log relationship fits these data, geometric means and natural logarithms of both toxicity and water quality are used in the rest of this section. For relationships based on other water quality characteristics, such as pH, temperature, no transformation, or a different transformation might fit the data better, and appropriate changes will be necessary throughout this section. It is probably preferable, but not necessary, to use the same transformation that was used with the acute values in subsection (f).)

(B) Decide whether the data for each species are relevant, taking into account the range and number of the tested values of the water quality characteristic and the degree of agreement within and between species. For example, a slope based on six (6) data points might be of limited value if it is based only on data for a very narrow range of values of the water quality characteristic. A slope based on only two (2) data points, however, might be more useful if it is consistent with other information and if the two (2) points cover a broad range of the water quality characteristic. In addition, chronic values that appear to be questionable in comparison with other acute and chronic data available for the same species and for other species in the same genus in most cases should not be used. For example, if after adjustment for the water quality characteristic, the chronic values available for a species or genus differ by more than a factor of ten (10), rejection of some or all of the values is, in most cases, absent countervailing circumstances, appropriate. If a useful chronic slope is not available for at least one (1) species or if the available slopes are too dissimilar or if too few data are available to adequately define the relationship between chronic toxicity and the water quality characteristic, it might be appropriate to assume that the chronic slope is the same as the acute slope, which is equivalent to assuming that the ACR is independent of the water quality characteristic. Alternatively, return to subsection (g)(8), using the results of tests conducted under conditions and in waters similar to those commonly used for toxicity tests with the species.

(C) Individually for each species, calculate the geometric mean of the available chronic values and then divide each chronic value for a species by the mean for the species. This normalizes the chronic values so that the geometric mean of the normalized values for each species individually, and for any combination of species, is one (1.0).

(D) Similarly, normalize the values of the water quality characteristic for each species individually.

(E) Individually for each species, perform a least squares regression of the normalized chronic toxicity values on the corresponding normalized values of the water quality characteristic. The resulting slopes and the ninety-five percent (95%) confidence limits will be identical to those obtained in this subdivision. Now, however, if the data are actually plotted, the line of best fit for each individual species will go through the point 1,1 in the center of the graph.

(F) Treat all of the normalized data as if they were all the same species and perform a least squares regression of all of the normalized chronic values on the corresponding normalized values of the water quality characteristic to obtain the pooled chronic slope, L, and its ninety-five percent (95%) confidence limits. If all normalized data are actually plotted, the line of best fit will go through the point 1,1 in the center of the graph.

(G) For each species, calculate the geometric mean, M, of the toxicity values and the geometric mean, P, of the values of the water quality characteristic. (These are calculated in clauses (C) and (D).)

(H) For each species, calculate the logarithm, Q, of the SMCV at a selected value, Z, of the water quality characteristic using the equation:

$$Q = \ln M - L(\ln P - \ln Z)$$

(Although it is not necessary, it is recommended that the same value of the water quality characteristic be used here as was used in subsection (f).)

(I) For each species, calculate a SMCV at Z using the equation:

$$SMCV = e^{Q}$$

(Alternatively, the SMCV at Z can be obtained by skipping clause (G), using the equations in clause (H) and this clause to adjust each chronic value individually to Z, and then calculating the geometric means of the adjusted values for each species individually. This alternative procedure allows an examination of the range of the adjusted chronic values for each species.)

(J) Obtain the FCV at Z by using the procedure described in subsection (e)(10) through (e)(15).

(3) If the SMCV at Z of a commercially or recreationally important species of the Great Lakes system is lower than the calculated FCV at Z, then that SMCV shall be used as the FCV at Z instead of the calculated FCV.

(4) The final chronic equation is written as:

$$FCV = e^{(L[\ln(\text{water quality characteristic})] + \ln S - L[\ln Z])}$$

Where: L = pooled chronic slope.

S = FCV at Z.

Because L, S, and Z are known, the FCV can be calculated for any selected value of the water quality characteristic.

(i) A final plant value (FPV) is the lowest plant value that was obtained with an important aquatic plant species in an acceptable toxicity test for which the concentrations of the test material were measured and the adverse effect was biologically important. Appropriate measures of the toxicity of the material to aquatic plants are used to compare the relative sensitivities of aquatic plants and animals. Although procedures for conducting and interpreting the results of toxicity tests with plants are not well-developed, results of tests with plants usually indicate that criteria which adequately protect aquatic animals and their uses will, in most cases, also protect aquatic plants and their uses. When developing an FPV, the following apply:

(1) A plant value is the result of a ninety-six (96) hour test conducted with an alga or a chronic test conducted with an aquatic vascular plant. (A test of the toxicity of a metal to a plant shall not be used if the medium contained an excessive amount of a complexing agent, such as EDTA, that might affect the toxicity of the metal. Concentrations of EDTA above two hundred (200) µg/L should be considered excessive.)

(2) The FPV shall be obtained by selecting the lowest result from a test with an important aquatic plant species in which the concentrations of test material are measured and the endpoint is biologically important.

(j) Pertinent information that could not be used in earlier subsections may be available concerning adverse effects on aquatic organisms. The following are data that may affect a criterion if the data were obtained with an important species, the test concentrations were measured, and the endpoint was biologically important:

(1) Cumulative and delayed toxicity, reduction in survival, growth, or reproduction, or any other adverse effect that has been shown to be biologically important. Delayed toxicity is an adverse effect to an organism that results from, and occurs after the end of, its exposure to one (1) or more test materials.

(2) Species for which no other data are available.

(3) Behavioral, biochemical, physiological, microcosm, and field studies.

(4) Tests conducted in unusual dilution water (see subsections (e)(4) and (g)(4)).

(5) Chronic tests in which the concentrations were not measured (see subsection (g)(2)).

(6) Tests with previously exposed organisms (see subsection (c)(6)(C)).

(7) Tests on formulated mixtures or emulsifiable concentrates (see subsection (c)(4)).

(k) A criterion consists of two (2) concentrations, the criterion maximum concentration (CMC) and the criterion continuous concentration (CCC), determined as follows:

(1) The CMC is equal to one-half (½) the FAV. The CMC is an estimate of the highest concentration of a material in the water column to which an aquatic community can be exposed briefly without resulting in an unacceptable effect.

(2) The CCC is equal to the lowest of the FCV or the FPV (if available) unless other data (see subsection (j)) show that a lower value should be used. The CCC is an estimate of the highest concentration of a material in the water column to which an aquatic

community can be exposed indefinitely without resulting in an unacceptable effect. If toxicity is related to a water quality characteristic, the CCC is obtained from the final chronic equation or FPV (if available) that results in the lowest concentrations in the usual range of the water quality characteristic, unless other data (see subsection (j)) show that a lower value should be used.

(3) Round both the CMC and the CCC to two (2) significant digits.

(4) The criterion is stated as follows:

(A) The procedures described in the Tier I methodology indicate that, except possibly where a commercially or recreationally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of (insert name of substance) does not exceed (insert the CCC for the substance) µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed (insert the CMC for the substance) µg/L more than once every three (3) years on the average.

(B) If the CMC averaging period of one (1) hour or the CCC averaging period of four (4) days is inappropriate for the pollutant, or if the once-in-three-year allowable excursion frequency is inappropriate for the pollutant or for the sites to which a criterion is applied, then the commissioner may specify alternative averaging periods or frequencies. The choice of an alternative averaging period or frequency shall be justified by a scientifically defensible analysis demonstrating that the alternative values will protect the aquatic life uses of the water. Appropriate laboratory data or well-designed field biological surveys shall be submitted to the U.S. EPA as justification for differing averaging periods or frequencies of exceedance.

(Water Pollution Control Board; 327 IAC 2-1.5-11; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1381; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3377)

SECTION 18. 327 IAC 2-1.5-16 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-16 Site-specific modifications to Tier I criteria and Tier II values

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-15-4-1; IC 13-18-4

Sec. 16. (a) Site-specific modifications ~~of~~ **to Tier I** criteria and **Tier II** values ~~in this subsection~~ must be protective of designated uses and aquatic life, wildlife, or human health. In addition, any site-specific modifications that result in less stringent criteria must be based on a sound scientific rationale and shall not be likely to jeopardize the continued existence of endangered or threatened species listed or proposed under Section 4 of the Endangered Species Act (ESA) or result in the destruction or adverse modification of such species' critical habitat. More stringent modifications shall be developed to protect endangered or threatened species listed or proposed under Section 4 of the ESA, where such modifications are necessary to ensure that water quality is not likely to jeopardize the continued existence of such species or result in the destruction or adverse modification of such species' critical habitat. More stringent modifications may also be developed to protect candidate (C1) species being considered by the U.S. Fish and Wildlife Service (FWS) for listing under Section 4 of the ESA, where such modifications are necessary to protect such species. Criteria and values may be modified on a site-specific basis to reflect local environmental conditions as restricted by the following provisions:

(1) Aquatic life criteria or values may be modified on a site-specific basis as follows:

(A) Aquatic life criteria or values may be modified on a site-specific basis to provide an additional level of protection.

(B) Less stringent site-specific modifications to chronic or acute aquatic life criteria or values may be developed when either of the following conditions apply:

(i) The local water quality characteristics such as pH, hardness, temperature, or color alter the biological availability or toxicity of a pollutant.

(ii) The sensitivity of the aquatic organisms species that occur at the site differs from the species actually tested in developing the criteria.

(C) Less stringent modifications also may be developed to acute and chronic aquatic life criteria or values to reflect local physical and hydrological conditions.

(D) Any modifications to protect threatened or endangered aquatic species required by this subsection may be accomplished using either of the two (2) following procedures:

(i) If the species mean acute value (SMAV) for a listed or proposed species, or for a surrogate of such species, is lower than the calculated final acute value (FAV), such lower SMAV may be used instead of the calculated FAV in developing site-

specific modified criteria.

(ii) The site-specific criteria may be calculated using the recalculation procedure for site-specific modifications **as described in EPA's Water Quality Standards Handbook, Second Edition-Revised (1994) Chapter 3 and Appendix L.**

(2) Wildlife criteria or values may be modified on a site-specific basis as follows:

(A) Wildlife water quality criteria may be modified on a site-specific basis to provide an additional level of protection.

(B) Less stringent site-specific modifications to wildlife water quality criteria may be developed when a site-specific bioaccumulation factor (BAF) is derived that is lower than the system-wide BAF derived under section 13 of this rule. The modification must consider both the mobility of prey organisms and wildlife populations in defining the site for which criteria are developed. In addition, there must be a showing that the following conditions are met:

(i) Any increased uptake of the toxicant by prey species utilizing the site will not cause adverse effects in wildlife populations.

(ii) Wildlife populations utilizing the site or downstream waters will continue to be fully protected.

(C) Any modification to protect endangered or threatened wildlife species required by this subsection must consider both the mobility of prey organisms and wildlife populations in defining the site for which criteria are developed and may be accomplished by using the following recommended method:

(i) The procedure presented in section 15 of this rule is used, substituting appropriate species-specific toxicological, epidemiological, or exposure information, including changes to the BAF.

(ii) An interspecies uncertainty factor of one (1) shall be used where epidemiological data are available for the species in question. If necessary, species-specific exposure parameters may be derived as presented in section 15 of this rule.

(iii) An intraspecies uncertainty factor, to account for protection of individuals within a wildlife population, shall be applied in the denominator of the effect part of the wildlife equation in section 15 of this rule in a manner consistent with the other uncertainty factors described in section 15 of this rule.

(iv) The resulting wildlife value for the species in question should be compared to the two (2) class specific wildlife values that were previously calculated, and the lowest of the three (3) shall be selected as the site-specific modification.

(3) BAFs may be modified on a site-specific basis as follows:

(A) BAFs may be modified on a site-specific basis to larger values where reliable data show that local bioaccumulation is greater than the system-wide value.

(B) BAFs may be modified on a site-specific basis to lower values, where scientifically defensible, if:

(i) the fraction of the total chemical that is freely dissolved in the ambient water is different than that used to derive the system-wide BAFs, that is, the concentrations of particulate organic carbon and the dissolved organic carbon are different than those used to derive the system-wide BAFs;

(ii) input parameters of the model, such as the structure of the aquatic food web and the disequilibrium constant, are different at the site than those used to derive the system-wide BAFs;

(iii) the percent lipid of aquatic organisms that are consumed and occur at the site is different than that used to derive the system-wide BAFs; or

(iv) site-specific field-measured BAFs or biota-sediment accumulation factor (BSAFs) are determined.

(C) If site-specific BAFs are derived, they shall be derived using section 13 of this rule.

(D) Any more stringent modifications to protect threatened or endangered species required by this subsection shall be derived using procedures set forth in the methodology in section 13 of this rule.

(4) Human health criteria or values may be modified on a site-specific basis as follows:

(A) Human health criteria or values may be modified on a site-specific basis to provide an additional level of protection **in accordance with the following:**

(i) Human health criteria or values shall be modified on a site-specific basis to provide additional protection appropriate for highly exposed subpopulations.

(ii) Any person may request the commissioner to develop a site-specific modification of a human health criterion or value to make it more stringent.

(iii) The commissioner shall develop the site-specific modification of the human health criterion or value to make it more stringent when either of the following conditions ~~apply:~~ **applies:**

~~(i)~~ **(AA)** Local fish consumption rates are higher than the rate used to derive a human health criterion or value applicable under section 14 of this rule.

~~(ii)~~ **(BB)** A site-specific BAF is derived that is higher than that used in deriving a human health criterion of value under section 14 of this rule.

(B) Less stringent site-specific modifications to human health criteria or values may be developed when any of the following conditions apply:

(i) Local fish consumption rates are lower than the rate used in deriving human health criteria or values under section 14 of this rule.

(ii) A site-specific BAF is derived that is lower than that used in deriving human health criteria or values under section 14 of this rule.

(C) Local fish consumption rates referenced in clauses ~~(A)(i)~~ **(A)(iii)(AA)** and (B)(i) shall be determined by a fish consumption survey applicable to the site.

(b) Upon receipt of ~~a request~~ **an application** for a site-specific modification ~~of~~ **to** a water quality criterion or value, the commissioner shall provide notice, request comment, and, if requested, schedule and hold a public meeting on the application in accordance with 327 IAC 5-2-11.2.

(Note: The approval process for site-specific modifications to criteria and values is included in the following subsections. IDEM is currently discussing this process with U.S. EPA Region 5 and could not reach a conclusion by the deadline for the submission of this draft rule. Therefore, IDEM is inserting this placeholder in the rules to inform interested parties that IDEM intends to revise the following subsections prior to preliminary adoption. Besides revising the following subsections, IDEM may include a detailed methodology for developing site-specific modifications to criteria if U.S. EPA would approve such a methodology.)

(c) When the commissioner proposes a site-specific modification to a criterion or value as allowed in this section, the tentative decision shall be incorporated into a draft permit ~~which~~ **that** is made available for public comment under 327 IAC 5-3-9. The commissioner shall notify the other Great Lakes states of such a proposal and, for less stringent criteria, shall supply appropriate supporting documentation for the modification.

(d) A final decision regarding a site-specific modification to a criterion or value shall be incorporated into the final NPDES permit. In addition, a reopening clause shall be included in the NPDES permit allowing the permit to be modified or revoked and reissued to revise the WQBELs based on the modified criterion or value if the board fails to adopt or the U.S. EPA fails to approve the modified criterion or value.

(e) All site-specific modifications to water quality criteria shall be incorporated into these water quality standards rules during the next revision of the water quality standards. The U.S. EPA will have the opportunity to review the modified criterion or value upon submittal of the revised water quality standards rules adopted by the board. *(Water Pollution Control Board; 327 IAC 2-1.5-16; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1407; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3378)*

SECTION 19. 327 IAC 2-1.5-20 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-1.5-20 Incorporation by reference

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4

Sec. 20. The following materials have been incorporated by reference into this rule. Each of the following items, in addition to its title, will list the name and address of where it may be located for inspection and copying:

(1) Clean Water Act (CWA), 33 U.S.C. 1251 et seq., in effect ~~December 16, 1996,~~ **July 1, 2003,** is available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or from the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(2) The map identifying 1995 United States Coast Guard Light List No. 19675 is available from the Indiana Department of

Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(3) Code of Federal Regulations (40 CFR 136) in effect ~~December 16, 1996,~~ **July 1, 2003,** are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402 or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(4) ASTM, 1990, Standard Practice for Conducting Bioconcentration Tests with Fishes and Saltwater Bivalve Molluscs, Standard E 1022, available from the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(5) 1986 U.S. EPA Guidelines for Carcinogenic Risk Assessment (U.S. EPA, 1986), available from the U.S. Environmental Protection Agency, Office of Water Resource Center (WH-550A), 401 M Street, S.W., Washington, D.C. 20460, and the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(6) U.S. EPA. 1993, Chapter 4, Wildlife Exposure Factors Handbook, Volumes I and II, available from U.S. Environmental Protection Agency, Office of Water Resource Center, 401 M Street, S.W., Washington, D.C. 20460 [EPA/600/R-93/187a and b], and the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

~~(7) "Standard Methods for the Examination of Water and Wastewater", Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Environment Federation, 18th Edition, 1992. Available from American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005, and the Indiana Department of Environmental Management, Office of Water Management, Indiana Government Center-North, 100 Senate Avenue, Indianapolis, Indiana 46206.~~

~~(8)~~ **(7)**1980 National Guidelines, 45 FR 79352 and 45 FR 79354.

(8) U.S. EPA Water Quality Standards Handbook, Second Edition-Revised (1994) Chapter 3 and Appendix L, available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water Quality, Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(Water Pollution Control Board; 327 IAC 2-1.5-20; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1412; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3378)

SECTION 20. 327 IAC 2-4-3 IS AMENDED TO READ AS FOLLOWS:

327 IAC 2-4-3 Sampling frequency; methods of analysis

Authority: IC 13-14-8; IC 13-14-9; IC 13-18-3

Affected: IC 13-18-4

Sec. 3. Sampling, measurements of flow and characteristics of the effluent shall be performed at a frequency prescribed by the commissioner. All analytical work shall be in accordance with ~~the 16th edition of "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association (APHA)~~ **40 CFR 136** or other methods approved by the commissioner. *(Water Pollution Control Board; 327 IAC 2-4-3; filed Sep 24, 1987, 3:00 p.m.: 11 IR 587; readopted filed Jan 10, 2001, 3:23 p.m.: 24 IR 1518)*

SECTION 21. 327 IAC 5-1.5-72 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-1.5-72 "Waters of the state of Indiana" or "waters of the state" defined

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2-265; IC 13-18-4

Sec. 72. "Waters of the state of Indiana" or "waters of the state" has the meaning set forth in ~~327 IAC 2-1.5-2(91).~~ **IC 13-11-2-265.** *(Water Pollution Control Board; 327 IAC 5-1.5-72; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1421; readopted filed Jan 10, 2001,*

3:23 p.m.: 24 IR 1518)

SECTION 22. 327 IAC 5-2-1.5 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-1.5 Incorporation by reference

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4

Sec. 1.5. The following materials have been incorporated by reference into this article. Each of the following items, in addition to its title, will list the name and address of where it may be located for inspection and copying:

(1) Clean Water Act (CWA), 33 U.S.C. 1251 et seq., in effect on ~~December 16, 1996,~~ **July 1, 2003,** is available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or from the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(2) All Federal Registers listed in this rule are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(3) Code of Federal Regulations (40 CFR 100–149, 40 CFR 400–424, and 40 CFR 425–699), in effect on ~~December 16, 1996,~~ **July 1, 2003,** are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(4) Standard Form A Municipal (EPA Form 7550-22), available from the U.S. Environmental Protection Agency, Office of Water Resource Center, 401 M Street, S.W., Washington, D.C. 20460, or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

(5) Pollution Prevention Act of 1990 (42 ~~USCA~~ **U.S.C.** 13101 ~~to 42 USCA 13109~~ **et seq.**), available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or the Indiana Department of Environmental Management, Office of Water ~~Management,~~ **Quality,** Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.

~~(6) "Standard Methods for the Examination of Water and Wastewater", Joint Editorial Board, American Public Health Association, American Water Works Association, and Water Environment Federation, 18th Edition, 1992. Available from American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005, and the Indiana Department of Environmental Management, Office of Water Management, Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana 46206.~~

(Water Pollution Control Board; 327 IAC 5-2-1.5; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1421; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3378)

SECTION 23. 327 IAC 5-2-11.1 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-11.1 Establishment of water quality-based effluent limitations for dischargers not discharging to waters within the Great Lakes system

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4

Sec. 11.1. (a) The water quality standards established through the criteria set forth in 327 IAC 2-1-6 or under the procedures described in 327 IAC 2-1-8.2 through 327 IAC 2-1-8.6 **and 327 IAC 2-1-8.9 shall:**

(1) ~~shall~~ be the basis for water quality-based effluent limitations applicable to point source dischargers, not discharging to waters within the Great Lakes system, through NPDES permits (except for instances where a variance has been approved under 327 IAC 2-1-8.8 and 327 IAC 5-3-4.1); and

(2) ~~shall~~ not be enforceable against point source dischargers until translated into effluent limitations ~~which~~ **that** are incorporated

in NPDES permits in accordance with this article.

(b) This subsection describes how the **surface** water quality criteria in 327 IAC 2-1-6(a) or those criteria derived using the procedures in 327 IAC 2-1-8.2 through 327 IAC 2-1-8.6 **and 327 IAC 2-1-8.9** will be applied in determining appropriate water quality-based effluent limitations to NPDES permits as follows:

(1) The final acute value (FAV = 2(AAC)) will be applied directly to the undiluted discharge, or, if dilution by discharge induced mixing is allowed, the AAC will be applied outside the discharge induced mixing zone. **If the AAC for a metal is expressed in the form of dissolved metal, the AAC shall be set equal to $C_{instream}$ determined for the AAC in accordance with subdivision (8).**

(2) The CAC and the TLSC will be applied outside of the mixing zone. In the absence of site-specific mixing zone data, the allowable mixing zone dilution shall be determined by applying the guideline in 327 IAC 2-1-4 to the $Q_{7,10}$ low flow of the receiving stream. **If the CAC for a metal is expressed in the form of dissolved metal, the CAC shall be set equal to $C_{instream}$ determined for the CAC in accordance with subdivision (8).**

(3) The HLSC shall be applied outside of the mixing zone, if based on the consumption of organisms and incidental water intake. If based on consumption of organisms and drinking water, the HLSC shall apply at the point of the **public** water ~~supply~~ **system** intake, if this does not cause the HLSC based on consumption of organisms and incidental water intake to be exceeded outside of the mixing zone. Allowable mixing zone dilution shall be determined by applying the guideline of 327 IAC 2-1-4 to the $Q_{7,10}$ low flow of the receiving stream if the HLSC is based on consumption of organisms and incidental water intake and the $Q_{7,10}$ flow at the point of **the public** water ~~supply~~ **system** intake (provided the effluent has had time to fully mix with the receiving water) shall be allowed for dilution if the HLSC is based on consumption of organisms and drinking water.

(4) The criterion to provide an acceptable degree of protection to public health for cancer effects shall apply outside of the mixing zone if the criterion is based on consumption of organisms and incidental water intake and at the point of **the public** water ~~supply~~ **system** intake if based on the consumption of organisms and drinking water, if this would not cause the criterion based on the consumption of organisms and incidental water intake to be exceeded outside of the mixing zone. For calculation of allowable dilution, one-fourth (¼) of the fiftieth percentile flow of the receiving stream shall be used if the criterion is based on consumption of organisms and incidental water intake, and the fiftieth percentile flow of the receiving stream at the point of **the public** water **system** intake can be used if the criterion is based on the consumption of organisms and drinking water.

(5) As used in this rule, "FAV", "AAC", "CAC", "TLSC", and "HLSC" have the ~~same~~ meanings ~~as defined~~ **set forth** in 327 IAC 2-1-9.

(6) For a new discharge of a BCC, the water quality ~~standard~~ **criteria** for a BCC shall be applied directly to the undiluted discharge. Beginning January 1, 2004, the water quality ~~standard~~ **criteria** for a BCC shall be applied directly to the undiluted discharge for all discharges of a BCC. As used in this subdivision, "new discharge" means a discharge of a BCC that is initiated after the effective date of this subdivision.

(7) For intermittent or controlled discharges, the mixing zone dilution may be determined using stream flows other than those specified in this subsection if these alternate stream flows will ensure compliance with water quality criteria.

(8) The following procedures shall be used to calculate $C_{instream}$, the total recoverable metal concentration outside the mixing zone that equates to an acute or chronic aquatic water quality criterion expressed in the form of dissolved metal:

(A) For an AAC expressed in the form of dissolved metal, $C_{instream}$ shall be calculated by dividing the AAC by the acute translator found in clause (D).

(B) For a CAC expressed in the form of dissolved metal, $C_{instream}$ shall be calculated by dividing the CAC by the chronic translator found in clause (D).

(C) If all approved analytical methods for the metal inherently measure only its dissolved form, such as hexavalent chromium, $C_{instream}$ shall not be calculated and the acute and chronic aquatic water quality criteria expressed in the form of dissolved metal shall be applied in determining appropriate water quality-based effluent limitations.

(D) Unless a site-specific translator is determined in accordance with clause (E), the following translators shall be used:

Table 11.1-1

Metals Translators

Dissolved to Total Recoverable

Substances	Acute Translators	Chronic Translators

Arsenic (III)	**1.000**	**1.000**
Cadmium	**1.136672-[(ln hardness)(0.041838)]**	**1.101672-[(ln hardness)(0.041838)]**
Chromium (III)	**0.316**	**0.860**
Copper	**0.960**	**0.960**
Lead	**1.46203-[(ln hardness)(0.145712)]**	**1.46203-[(ln hardness)(0.145712)]**
Nickel	**0.998**	**0.997**
Silver	**0.85**	
Zinc	**0.978**	**0.986**

(E) A discharger or proposed discharger may request the use of an alternate translator by using site-specific data. The discharger must conduct a site-specific study to identify the ratio of the dissolved fraction to the total recoverable fraction for a metal in the receiving waterbody outside the mixing zone. If the discharger provides an acceptable study and other provisions of 327 IAC 2-1 and this article are satisfied (such as antibacksliding and antidegradation), the commissioner shall use the site-specific translator. A translator derived for one (1) discharge into a waterbody segment may be applied to other discharges on the same waterbody segment if the translator would adequately represent the site-specific conditions applicable to the other discharges.

(c) In a case where a variance has been granted from a water quality standard under 327 IAC 2-1-8.8 and 327 IAC 5-3-4.1, water quality-based effluent limitations for the pollutant that is the subject of the variance shall be calculated under subsection (b) on the basis of the variance rather than the water quality standard.

~~(d) In accordance with 327 IAC 2-1-6(a)(3), effluent limitations which are based on water quality criteria for metals from 327 IAC 2-1-6(a)(2) Table 1, or subsequently developed under the procedures contained under 327 IAC 2-1-8, shall be expressed as the total recoverable fraction unless any of the following occur:~~

~~(1) An acid-soluble analytical method for the metal has been approved by EPA and the board through rulemaking, in which case the effluent limitation may be expressed as acid-soluble fraction.~~

~~(2) For a specific permittee, the commissioner determines that it is feasible to identify the ratio of the soluble fraction to the total recoverable fraction for a metal in the permittee's discharge after mixing with the receiving stream, in which case the effluent limitation shall be expressed as the total recoverable fraction for which the numeric limit has been increased on the basis of the ratio.~~

(d) Water quality-based effluent limitations in an NPDES permit for a metal calculated from a water quality criterion expressed in the form of dissolved metal that is:

(1) contained in 327 IAC 2-1; or

(2) subsequently developed under the procedures contained in 327 IAC 2-1;

shall be expressed in the permit as total recoverable metal unless ~~(3)~~ all approved analytical methods for the metal inherently measure only its dissolved form, ~~for example,~~ **such as** hexavalent chromium.

~~(e) It is the express intent of the board that, when an acid-soluble analytical method is approved for metals, the redesignation of numeric effluent limitations from total recoverable fraction to acid-soluble fraction shall not be construed as backsliding for purposes of Section 402(o) of the Clean Water Act (CWA) in cases where the effluent limitations are based on the acid-soluble criteria of 327 IAC 2-1-6(a)(2) Table 1.~~

(e) Water quality-based effluent limitations for cyanide, calculated from a criterion for free cyanide contained in 327 IAC 2-1, shall be limited in the permit as free cyanide and monitored in the effluent using the "Cyanides Amenable to Chlorination" (CATC) method (40 CFR 136, Method 4500-CN G) or another method approved by the commissioner. The commissioner may include additional monitoring, limitations, or other requirements in a permit, on a case-by-case basis, if the additional requirements are necessary to ensure that water quality standards will be attained.

(f) When the water quality-based effluent limitation for any substance is less than the limit of quantitation normally achievable and determined by the commissioner to be appropriate for that substance in the effluent, the permit shall contain the following provisions:

(1) The permittee shall be required to use an approved analytical methodology for the substance in the effluent to produce the LOD and LOQ achievable in the effluent. This analytical method, and the LOD and LOQ associated with this method, shall be specified in the permit in addition to the following requirements:

(A) The permit shall include conditions that state that effluent concentrations less than the limit of quantitation are in compliance with the effluent limitations.

(B) In addition, the permit shall require the permittee to implement one (1) or more of the following requirements:

(i) Develop a more sensitive analytical procedure.

(ii) Use an existing, more sensitive, analytical procedure that has not been approved by EPA.

(iii) Conduct studies to determine the bioaccumulative or bioconcentrative properties of the substance in aquatic species through caged-biota studies or fish tissue analyses of resident species.

(iv) Conduct effluent bioconcentration evaluations.

(v) Conduct whole effluent toxicity testing.

(vi) Other requirements, as appropriate, such as engineering assessments or sediment analyses.

For substances defined as bioaccumulative chemicals of concern, at a minimum, either item (iii) or (iv) shall be included in the permit.

(2) If the measured effluent concentrations for a substance are above the water quality-based ~~permit~~ **effluent** limitations and above the limit of detection specified by the permit in any three (3) consecutive analyses or any five (5) out of nine (9) analyses, or if any of the additional analyses required under subdivision (1)(B) indicate that the substance is present in the effluent at concentrations exceeding the water quality-based ~~permit~~ **effluent** limitations, the permit shall contain provisions that require the discharger to:

(A) determine the source of this substance through evaluation of sampling techniques, analytical/laboratory procedures, and industrial processes and waste streams; and

(B) increase the frequency of sampling and testing for the substance.

(3) The permit shall contain provisions allowing the permit to be reopened, in accordance with section 16 of this rule, to include additional requirements or limitations if the information gathered under subdivisions (1) and (2) indicates that such additional requirements or limitations are necessary.

(g) The department shall use the representative ambient upstream concentration of a substance in determining the water quality-based effluent limitations for that substance. This upstream concentration shall be determined by the department on a case-by-case basis, using existing, acceptable data for the receiving water. Where limited or no acceptable data exists, the permittee shall be required to supply the necessary data. Whenever the representative ambient upstream concentration for a substance in the receiving water is determined to be greater than any applicable water quality ~~standard~~ **criterion** for that substance, the following conditions apply:

(1) If the source of the wastewater is not the receiving water, the permit limitations shall be calculated using the applicable water quality ~~standard~~ **criterion** and a value of zero (0) for the upstream dilution flow. Except for substances defined as bioaccumulative chemicals of concern, the department may establish limitations greater than the applicable water quality ~~standard~~ **criterion** for the substance as required in this subdivision, in a range up to, but not greater than, the lesser of the representative ambient upstream concentration of the substance in the receiving water or the representative ambient concentration of the substance in the body of water at the point of intake. The limitation shall only be increased above the ~~standard~~ **criterion** if it is demonstrated to the department that the concentration of the substance in the body of water at the point of intake exceeds the applicable ~~standard~~ **criterion** for that substance and that reasonable, practical, or otherwise required methods are implemented to minimize the addition of the substance to the wastewater.

(2) If the source of the wastewater is the receiving water, the effluent limitation for that substance shall equal the representative ambient upstream concentration of that substance in the receiving water as determined by the department. Where circumstances allow, such as the discharge of once through noncontact cooling water, this will be implemented through the use of net limitations, with a net limitation of zero (0) being applied to the effluent. The representative ambient upstream concentration applicable to this subdivision shall be established at the upper ninety-ninth percentile of the available acceptable upstream data or otherwise appropriately determined as the reasonably expected upstream concentration for that substance.

(h) In addition to the requirements of 40 CFR 122.43(a), NPDES permits shall include limitations more stringent than promulgated effluent limitations guidelines from Sections 301, 306, 307, 318, and 405 of the CWA where necessary to achieve water quality standards established under Section 303 of the CWA, including narrative criteria for water quality as follows:

(1) Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants), ~~which~~ **that** the commissioner determines are, or may be, discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any narrative or numeric water quality ~~standard~~ **criterion** promulgated under 327 IAC 2-1-6.

(2) When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numeric ~~criteria~~ **criterion** within an Indiana water quality standard, the commissioner shall use procedures ~~which~~ **that** account for existing controls on point and nonpoint ~~source~~ **sources** of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and, where appropriate, the dilution of the effluent in the receiving water.

(3) When the commissioner determines, using the procedures in subdivision (2), that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a numeric ~~criteria~~ **criterion** from 327 IAC 2-1-6 for an individual pollutant, the permit must contain effluent limitations for that pollutant.

(4) When the commissioner determines, using the procedures in subdivision (2), that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the numeric criterion for whole effluent toxicity, the permit must contain effluent limits for whole effluent toxicity.

(5) Except as provided in this subdivision, when the commissioner determines, using the procedures in subdivision (2), toxicity testing ~~date,~~ **data,** or other information, that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative criterion from 327 IAC 2-1-6, the permit must contain effluent limitations for whole effluent toxicity. Limitations on whole effluent toxicity are not necessary where the commissioner demonstrates in the fact sheet or briefing memo of the NPDES permit, using the procedures in subdivision (2), that chemical-specific limits for the effluent are sufficient to attain and maintain applicable numeric and narrative water quality ~~standards.~~ **criteria.**

(6) Where a water quality criterion has not been established for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion from 327 IAC 2-1-6, the commissioner must establish effluent limits using one (1) or more of the following options:

(A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant ~~which~~ **that** the commissioner demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived using a proposed state criterion, or an explicit policy or rule interpreting the narrative water quality criterion, supplemented with other relevant information that may include:

(i) EPA's Water Quality Standards Handbook, Second Edition–Revised (1994);

(ii) risk assessment data;

(iii) exposure ~~date;~~ **data;**

(iv) information about the pollutant from the Food and Drug Administration; and

(v) current EPA criteria documents.

(B) Establish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under Section ~~307(a)~~ **304(a)** of the CWA, supplemented where necessary by other relevant information.

(C) Establish effluent limitations on an indicator parameter for the pollutant of concern, provided the following:

(i) The permit identifies which pollutants are intended to be controlled by the use of the effluent limitation.

(ii) The fact sheet required by 327 IAC 5-3-8 sets forth the basis for the limit, including a finding that compliance with the effluent limit on the indicator parameter will result in controls on the pollutant of concern that are sufficient to attain and maintain applicable water quality standards.

(iii) The permit requires all effluent and ambient monitoring necessary to show that during the term of the permit the limit on the indicator parameter continues to attain and maintain applicable water quality standards.

(iv) The permit contains a reopening clause allowing the permitting authority to modify or revoke and reissue the permit if the limits on the indicator parameter no longer attain and maintain applicable water quality standards.

(7) When developing water quality-based effluent limits under this subsection, the commissioner shall ensure the following:

(A) The level of water quality to be achieved by limits on point sources established under this subsection is derived from, and complies with, all applicable water quality standards.

(B) Effluent limits developed to protect a narrative water quality criterion **or** a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available waste load allocation for the discharge prepared by the commissioner and approved by EPA under 40 CFR 130.7.

~~(i) Water quality-based limitations may be expressed, where appropriate, in terms of toxicity or toxic units (TU), for example, the LC_{10} for fathead minnow of the effluent from outfall 001 shall be greater than one hundred percent (100%) or shall not exceed one (1) TU_a. As used in this subsection, "toxic unit" or "TU" means the unit used for whole effluent toxicity-based limitations for the protection of the receiving stream from toxic effects and is defined as one hundred (100) divided by the LC_{10} or the no observed effect level (NOEL).~~

(Water Pollution Control Board; 327 IAC 5-2-11.1; filed Feb 1, 1990, 4:30 p.m.: 13 IR 1043; filed Feb 26, 1993, 5:00 p.m.: 16 IR 1749; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1432; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3378)

SECTION 24. 327 IAC 5-2-11.2 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-11.2 Public notice of comment period and public meetings for site-specific modification of water quality criteria and values; implementation of antidegradation; alternate mixing zone demonstrations; variances

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-15-4-1; IC 13-15-5-1; IC 13-18-4; IC 13-18-7; IC 13-23-13; IC 13-24-1; IC 13-25-5

Sec. 11.2. (a) This section is applicable to **an application for** the following:

(1) ~~An application for~~ Site-specific modification ~~of~~ **to water quality criteria under 327 IAC 2-1-8.9(b) and** Tier I water quality criteria and Tier II water quality values under 327 IAC 2-1.5-16(b).

(2) ~~An application for~~ An antidegradation demonstration under section 11.3(b)(4) of this rule.

(3) ~~An application for~~ An antidegradation exception under section 11.7(c) of this rule.

(4) ~~An application for~~ An alternate mixing zone under section ~~11.4(b)(4)(D)~~ **11.4(b)(4)(F)** of this rule.

(5) ~~An application for~~ A variance under 327 IAC 5-3-4.1(c).

(b) Upon receipt of an application listed in subsection (a), the commissioner shall provide notice, request comment, and, if requested, schedule and hold a public meeting on the application in accordance with the following conditions:

(1) The commissioner shall provide notice of receipt of an application in the following manner:

(A) Publication of a notice in a daily or weekly newspaper in general circulation throughout the area affected by the discharge for which the application was submitted.

(B) Send the notice to interested persons on either ~~of~~ **mailing list identified under** the following: ~~mailing lists:~~

(i) ~~The mailing list identified under~~ 327 IAC 5-3-8(a).

(ii) ~~The mailing list identified under~~ 327 IAC 5-3-12(b)(1).

(C) Send the notice to the applicant.

(2) The notice under subdivision (1) shall contain the following:

(A) Name and address of the department.

(B) Name and address of the applicant.

(C) An identification of the type of application submitted, such as alternate mixing zone or variance.

(D) A brief description of the location of any existing or proposed discharge point subject to the application, including an identification of the receiving water.

(E) A brief description of the applicant's activities or operations that result in the discharge identified in the application.

(F) An identification of the substance for which the application was submitted.

(G) Name of an agency contact person, and an address and telephone number where interested persons may obtain further information, including a copy of the application.

(H) A brief description of the comment procedures and the procedures to request a public meeting.

(3) If requested, the commissioner shall hold a public meeting on the application in accordance with the following provisions:

(A) The commissioner shall provide notice of the public meeting as follows:

(i) Publication of a notice in a daily or weekly newspaper in general circulation throughout the area affected by the discharge for which the application was submitted.

(ii) Send the notice to the following interested persons:

(AA) Persons on the mailing list identified under 327 IAC 5-3-8(a).

(BB) Persons on the mailing list identified under 327 IAC 5-3-12(b)(1).

(CC) Those persons that commented on the notice of receipt of the application.

(iii) Send the notice to the applicant.

(B) The notice required by clause (A) shall contain the date, time, and place of the public meeting, and the information required under subdivision (2).

(C) This meeting shall be held at least ten (10) days after the later of the following:

(i) The notice in accordance with clause (A)(i) appears in the newspaper.

(ii) The postmark date of the written notice sent to interested parties and to the applicant in accordance with clause (A)(ii) and (A)(iii).

(D) The meeting shall be recorded by any of the following:

(i) Audio tape.

(ii) Video tape.

(iii) Any other method of accurately and completely recording the details of the meeting.

(E) The commissioner shall request the applicant to provide a summary and rationale for the application at the meeting.

(F) At the commissioner's discretion, a public meeting may be noticed and held without having first received a request for a public meeting. In these instances, the notice for the public meeting may be contained in the notice of receipt of the application.

(4) The time period under IC 13-15-4-1 is hereby changed to increase the period by thirty (30) days for any permit application subject to the time period that is affected by the application. If a public meeting is requested, the time period under IC 13-15-4-1 is hereby changed to increase the period by an additional thirty (30) days.

(Water Pollution Control Board; 327 IAC 5-2-11.2; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1435; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3378)

SECTION 25. 327 IAC 5-2-11.4 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-11.4 Great Lakes system dischargers total maximum daily loads; wasteload allocations for point sources; load allocations for nonpoint sources; preliminary wasteload allocations

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4-7; IC 13-18-4-8

Sec. 11.4. (a) This subsection applies to the establishment of total maximum daily loads (TMDLs) for all pollutants and pollutant parameters in the Great Lakes system. Where specified, the following conditions also apply to wasteload allocations (WLAs) calculated in the absence of TMDLs and to preliminary WLAs:

(1) At a minimum, TMDLs shall be established in accordance with the listing and priority setting process established in Section 303(d) of the Clean Water Act (CWA) and at 40 CFR 130.7. Where water quality standards cannot be attained immediately, TMDLs must reflect reasonable assurances that water quality standards will be attained in a reasonable period of time. TMDLs may be based on attaining water quality standards over a period of time, with specific controls on individual sources being implemented in stages. Determining the reasonable period of time in which water quality standards will be met is a case-specific determination considering a number of factors, including, but not limited to, the following:

(A) Receiving water characteristics.

(B) Persistence, behavior, and ubiquity of pollutants of concern.

(C) Type of remediation activities necessary.

(D) Available regulatory and nonregulatory controls.

(E) Requirements for attainment of water quality standards.

(2) An assessment and remediation plan that the commissioner has certified as meeting the requirements of this section pertaining to TMDLs and public participation requirements applicable to TMDLs, and that has been approved by EPA as meeting those requirements under 40 CFR 130.6, may be used in lieu of a TMDL for purposes of this section. Assessment and remediation plans under this section may include, but are not limited to, Lakewide Management Plans, Remedial Action Plans, and State Water Quality Management Plans. Also, any part of an assessment and remediation plan that also satisfies one (1) or more requirements under Section 303(d) of the CWA or implementing regulations may be incorporated by reference into a TMDL as appropriate. Assessment and remediation plans under this section shall be tailored to the level of detail and magnitude for the watershed and pollutant being assessed.

(3) TMDLs, WLAs calculated in the absence of a TMDL, and preliminary WLAs must ensure attainment of applicable water quality standards including all numeric and narrative water quality criteria set forth in 327 IAC 2-1.5-8, and Tier I criteria and Tier II values established under 327 IAC 2-1.5-11 through 327 IAC 2-1.5-16.

(4) If a discharge contains one (1) or more substances for which a TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA was based on a human cancer criterion (HCC), human cancer value (HCV), human noncancer criterion (HNC), or human noncancer value (HNV), human health shall be protected from the potential adverse additive effects of mixtures of substances in an effluent in accordance with the following procedures:

(A) If an effluent for a particular discharger contains more than one (1) substance for which an HCC exists or for which an HCC or an HCV can be calculated, the additivity of the mixture of carcinogens shall be addressed as follows:

(i) Except as provided in item (ii), the TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA based on an HCC or HCV shall be established to protect against additive effects possibly associated with simultaneous multiple chemical human exposure to carcinogens such that the following condition is met:

$$\sum \frac{C_i}{WLA_i} \leq 1; \qquad \text{For } i = 1 \text{ to } n$$

Where:

C = The adjusted TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA concentration of each separate carcinogen that shall be used in the calculation of reasonable potential in section 11.5 of this rule and WQBELs in section 11.6 of this rule.

WLA = The TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA concentration based on the HCC or HCV for each respective carcinogen.

n = Number of WLAs based on an HCC or HCV.

(ii) Notwithstanding item (i):

(AA) the commissioner may consider, upon submission of the discharger, the use of an alternate, scientifically-based, procedure for ensuring the aggregate risk of the mixture of carcinogens remains below one (1) in one hundred thousand (100,000); or

(BB) if information is available to the commissioner demonstrating that available scientific information does not support the assumption of additivity, the TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA shall not be adjusted for each such substance.

(B) If an effluent for a particular discharger contains more than one (1) substance for which a HNC exists or for which a HNC or HNV can be calculated, the additivity of the mixture of substances shall be addressed as follows:

(i) The incremental adverse effect of each substance shall be assumed to not be additive except as provided in item (ii).

(ii) If scientific information available to the commissioner demonstrates that the adverse effects of the components are additive, the TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA for each additive noncarcinogenic substance shall be established to protect against additive ~~or~~ effects possibly associated with simultaneous multiple chemical human exposure such that the following condition is met:

$$\sum \frac{N_i}{WLA_i} \leq 1; \qquad \text{For } i = 1 \text{ to } n$$

Where:

N = The adjusted TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA concentration of each separate substance that shall be used in the calculation of reasonable potential in section 11.5 of this rule and WQBELs in section 11.6 of this rule.

WLA = The TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA concentration based on the HNC or HNV for each respective substance.

n = Number of WLAs based on an HNC or HNV.

(C) Notwithstanding the requirements of clauses (A) and (B), the toxicity equivalency factors (TEFs) and bioaccumulation equivalency factors (BEFs) for the chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs) shall be accounted for as follows:

(i) The TEFs and BEFs in Table 11.4-1 in item (iv) shall be used when calculating a 2,3,7,8-TCDD toxicity equivalence concentration in effluent to be used when implementing both human health noncancer and cancer criteria. The chemical concentration of each CDDs and CDFs in effluent shall be converted to a 2,3,7,8-TCDD toxicity equivalence concentration in effluent by:

(AA) multiplying the chemical concentration of each CDDs and CDFs in the effluent by the appropriate TEF in Table 11.4-1 in item (iv);

(BB) multiplying each product from subitem (AA) by the BEF for each CDDs and CDFs in Table 11.4-1 in item (iv); and

(CC) adding all final products from subitem (BB).

(ii) The equation for calculating the 2,3,7,8-TCDD toxicity equivalence concentration in effluent is:

$$(TEC)_{tcdd} = \sum (C)_x (TEF)_x (BEF)_x$$

Where:

$(TEC)_{tcdd}$ = 2,3,7,8-TCDD toxicity equivalence concentration in effluent.

$(C)_x$ = Concentration of total chemical x in effluent.

$(TEF)_x$ = TCDD toxicity equivalency factor for x.

$(BEF)_x$ = TCDD bioaccumulation equivalency factor for x.

(iii) The 2,3,7,8-TCDD toxicity equivalence concentration in effluent shall be used when developing TMDLs, wasteload allocations in the absence of a TMDL, or preliminary wasteload allocations under this section.

(iv) The following values shall be used for TEFs and BEFs for CDDs and CDFs:

Table 11.4-1

Toxicity Equivalency Factors (TEF) and

Bioaccumulation Equivalency Factors (BEF)

for CDDs and CDFs

Congener	TEF	BEF
2,3,7,8-TCDD	1.0	1.0
1,2,3,7,8-PeCDD	0.5	0.9
1,2,3,4,7,8-HxCDD	0.1	0.3
1,2,3,6,7,8-HxCDD	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.05
OCDD	0.001	0.01
2,3,7,8-TCDF	0.1	0.8
1,2,3,7,8-PeCDF	0.05	0.2
2,3,4,7,8-PeCDF	0.5	1.6
1,2,3,4,7,8-HxCDF	0.1	0.08
1,2,3,6,7,8-HxCDF	0.1	0.2
2,3,4,6,7,8-HxCDF	0.1	0.7
1,2,3,7,8,9-HxCDF	0.1	0.6

1,2,3,4,6,7,8-HpCDF	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.4
OCDF	0.001	0.02

(5) TMDLs shall include WLAs for point sources and load allocations (LAs) for nonpoint sources, including natural background, such that the sum of these allocations is not greater than the loading capacity of the water for the pollutant addressed by the TMDL, minus the sum of a specified margin of safety (MOS) and any capacity reserved for future growth. The components of the TMDL are as follows:

(A) Nonpoint source LAs that shall be based on any of the following:

(i) Existing pollutant loadings if changes in loadings are not reasonably anticipated to occur.

(ii) Increases in pollutant loadings that are reasonably anticipated to occur.

(iii) Anticipated decreases in pollutant loadings if such decreased loadings are technically feasible and are reasonably anticipated to occur within a reasonable time period as a result of implementation of BMPs or other load reduction measures. In determining whether anticipated decreases in pollutant loadings are technically feasible and can reasonably be expected to occur within a reasonable period of time, technical and institutional factors shall be considered. These decisions are case-specific and should reflect the particular TMDL under consideration.

(iv) Where appropriate and where sufficient data are available, contributions to the water column from sediments inside and outside of any applicable mixing zones.

(v) Where appropriate and where sufficient data are available, nonpoint source discharges resulting from wet weather events.

Monitoring data for these LAs shall be collected and analyzed in order to validate the TMDL's assumptions, to verify anticipated load reductions, to evaluate the effectiveness of controls being used to implement the TMDL, and to revise the WLAs and LAs as necessary to ensure that water quality criteria shall be achieved within the time period established in the TMDL.

(B) Each TMDL shall include a margin of safety (MOS) sufficient to account for technical uncertainties in establishing the TMDL and shall describe the manner in which the MOS is determined and incorporated into the TMDL. The MOS may be provided by leaving a portion of the loading capacity unallocated or by using conservative modeling assumptions to establish WLAs and LAs. If a portion of the loading capacity is left unallocated to provide a MOS, the amount left unallocated shall be described. If conservative modeling assumptions are relied on to provide a MOS, the specific assumptions providing the MOS shall be identified.

(C) TMDLs may include reserved allocations of loading capacity to accommodate future growth and additional sources. Where such reserved allocations are not included in a TMDL, any increased loadings of the pollutant for which the TMDL was developed that are due to a new or expanded discharge shall not be allowed unless the TMDL is revised in accordance with these procedures to include an allocation for the new or expanded discharge.

(D) The sum of the WLAs is the portion of the loading capacity not assigned to nonpoint sources including background, or to an MOS, or reserved for future growth. Where appropriate and where sufficient data are available, WLAs shall also be developed for point source discharges resulting from wet weather events. Upon reissuance, NPDES permits for these point sources must include effluent limitations consistent with WLAs in EPA-approved or EPA-established TMDLs.

(6) If separate TMDLs are prepared for different segments of the same watershed, and the separate TMDLs each include WLAs for the same pollutant for one (1) or more of the same point sources, then WQBELs for that pollutant for the point sources shall be consistent with the most stringent of those WLAs in order to ensure attainment of all applicable water quality standards.

(7) TMDLs shall be sufficiently stringent so as to prevent accumulation of the pollutant of concern in sediments to levels injurious to designated or existing uses, human health, wildlife, and aquatic life.

(8) The representative background concentration of pollutants shall be established in accordance with this section to develop TMDLs, WLAs calculated in the absence of a TMDL, ~~or~~ **and** preliminary WLAs. Background loadings may be accounted for in a TMDL through an allocation to a single background category or through individual allocations to the various background sources as follows:

(A) As used in this subsection, "background" represents all loadings resulting from the following:

(i) Flow from upstream waters into the specified watershed, waterbody, or waterbody segment for which a TMDL, WLA in the absence of a TMDL, or preliminary WLA for the purpose of determining the need for a WQBEL is being developed.

(ii) Atmospheric deposition or sediment release or resuspension.

(iii) Chemical reactions occurring within the watershed, waterbody, or waterbody segment.

(B) When determining what available data are acceptable for use in calculating background, the commissioner shall use best professional judgment, including consideration of the sampling location and the reliability of the data through comparison to reported analytical detection levels. Pollutant degradation and transport information may be considered when utilizing pollutant loading data. Where limited or no acceptable data exist, the commissioner may require the permittee to supply the necessary data. Best professional judgment shall be used to select the one (1) data set that most accurately reflects or estimates background concentrations when data in more than one (1) of the following data sets or categories exist:

(i) Acceptable available water column data.

(ii) Water column concentrations estimated through use of acceptable available caged or resident fish tissue data.

(iii) Water column concentrations estimated through use of acceptable available or projected pollutant loading data.

(C) The representative background concentration for a substance in the specified watershed, waterbody, or waterbody segment shall be established as follows:

(i) If all the values in the data set selected in clause (B) are at or above the limit of detection (LOD), then the background concentration is the geometric mean of that data set.

(ii) If the data set consists of values above and below the LOD, the following procedure shall be used to determine the representative background concentration:

(AA) Each value in the data set with a value less than the LOD (nondetect) shall be assigned the value (V). The geometric mean of this adjusted data set is the representative background concentration. The value (V) is determined as follows:

$$V = (LOD) \times \left(1 - \frac{\text{Number of nondetects}}{\text{Total number of values}}\right)$$

(BB) If information is available that indicates an alternate methodology for evaluating the data set would result in a background concentration more representative of actual conditions, this alternative methodology may be used in place of the methodology contained in subitem (AA) upon approval of the commissioner.

(iii) When all of the acceptable available data in a data set or category, such as water column, caged or resident fish tissue, or pollutant loading data, are below the LOD for a substance, and the most sensitive approved analytical method available for that substance was used, then all the data for that pollutant in that data set shall be assumed to be zero (0).

(iv) Notwithstanding items (i) through (iii), the representative background concentration of whole effluent toxicity (WET) shall be assumed to be zero (0) unless data are available that indicates that the discharge of the WET and any background WET are additive.

(9) The effluent flow used to develop TMDLs, WLAs calculated in the absence of a TMDL, ~~or~~ **and** preliminary WLAs shall be determined as follows:

(A) For municipal, semipublic, and other sanitary or domestic wastewater discharges, the average design flow of the treatment facility shall be used.

(B) For industrial dischargers, the highest monthly average flow from the previous two (2) years of monitoring shall be used.

(C) Notwithstanding clauses (A) and (B), an alternate effluent flow value may be used, upon approval by the commissioner, if the discharger provides flow data that supports the alternate value (such as when a TMDL or WLA is calculated for wet weather conditions as provided in section 11.6(g)(4) of this rule). This flow data shall be included with the application for a new permit, a renewal of an existing permit, or with a request for modification of an existing permit, or when requested by the commissioner.

(D) TMDLs, WLAs calculated in the absence of a TMDL, ~~or~~ **and** preliminary WLAs shall indicate the point source effluent flows used in the analyses.

(10) The portion of the receiving waterbody allocated for mixing for TMDLs, WLAs calculated in the absence of a TMDL, ~~or~~ **and** preliminary WLAs shall be determined in accordance with subsection (b).

(11) TMDLs, WLAs in the absence of a TMDL, and preliminary WLAs shall be based on the assumption that a pollutant does not degrade. However, the commissioner may take into account degradation of the pollutant if each of the following conditions are met:

(A) Scientifically valid field studies or other relevant information demonstrate that degradation of the pollutant is expected to occur under the full range of environmental conditions expected to be encountered.

(B) Scientifically valid field studies or other relevant information address other factors that affect the level of pollutants in the water column, including, but not limited to, the following:

(i) Resuspension of sediments.

(ii) Chemical speciation.

(iii) Biological and chemical transformation.

(C) Notwithstanding clauses (A) and (B), TMDLs, WLAs in the absence of a TMDL, and preliminary WLAs conducted for chlorine and whole effluent toxicity shall be based on the assumption that the parameter does degrade unless data for the waterbody are available indicating otherwise.

(12) As used in this section, "loading capacity" refers to the greatest amount of loading that a water can receive without violating water quality standards. The loading capacity is initially calculated at the farthest downstream location in the watershed drainage basin. The maximum allowable loading consistent with the attainment of each applicable numeric criterion or value for a given pollutant is determined by multiplying the applicable criterion or value by the flow at the farthest downstream location in the tributary basin at the design flow condition described under subsection (b) and by using appropriate conversion factors. This loading is then compared to the loadings at sites within the basin to assure that applicable numeric criteria or values for a given pollutant are not exceeded at all applicable sites. The lowest load is then selected as the loading capacity.

(13) The ambient water quality characteristics used to develop TMDLs, WLAs calculated in the absence of a TMDL, ~~or~~ **and** preliminary WLAs shall be determined as follows:

(A) For ammonia (as N), metals dependent on hardness, and pentachlorophenol, the appropriate water quality characteristics shall be obtained at a location downstream of the point of discharge, or for Lake Michigan, outside the applicable mixing zone and shall be determined as follows:

(i) For ammonia (as N), the seventy-fifth percentile of the pH and temperature. If a seasonal TMDL, WLA calculated in the absence of a TMDL, or preliminary WLA is developed for ammonia, the pH and temperature data shall be obtained from the appropriate seasonal period.

(ii) For metals dependent on hardness, the fiftieth percentile of the hardness.

(iii) For pentachlorophenol, the fiftieth percentile of the ~~temperature.~~ **pH.**

(B) If any of the data required under clause (A) are not available for the waterbody, the data shall either be obtained from similar nearby streams or the permittee will be required to obtain the necessary data. For discharges to Lake Michigan, data from Lake Michigan shall be required.

(C) The use of the data required in clause (A) is intended to determine values of those water quality characteristics that are representative of those characteristics at design conditions. If it is demonstrated that an alternate method of determining these characteristics for a specific receiving waterbody would result in values more representative of the characteristics at design conditions, then this alternate method may be used to determine the water quality characteristics.

(b) The following requirements shall be applied in establishing the portion of the receiving waterbody allocated for mixing for TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs:

(1) The following procedures shall be used to establish the portion of the receiving waterbody allocated for mixing for TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs for a BCC:

(A) For purposes of this subsection, new and existing discharges are determined as follows:

(i) New discharges are defined as:

(AA) discharges from new Great Lakes dischargers; or

(BB) new or expanded discharges from an existing Great Lakes discharger.

(ii) Existing discharges are defined as all discharges of BCCs not included in item (i).

(B) There shall be no mixing zone available for a new discharge of a BCC to the Great Lakes system. WLAs established through TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs for a new discharge of a BCC shall be set equal to the most stringent applicable water quality ~~criteria~~ **criterion** or ~~values~~ **value** for the BCC.

(C) A mixing zone may be allocated for a BCC for an existing discharge to the Great Lakes system ~~pursuant to~~ **under** subdivisions (2) and (3) until January 1, 2004, except for a discharge into the open waters of Lake Michigan. WLAs established through TMDLs, WLAs established in the absence of TMDLs, and preliminary WLAs for all discharges, both new and existing, into the open waters of Lake Michigan shall be set equal to the most stringent applicable water quality criterion or value for the BCC.

(D) Except as provided in clauses (E) and (F), NPDES permits shall not authorize mixing zones for existing discharges of a BCC to the Great Lakes system after January 1, 2004. After January 1, 2004, WLAs established through TMDLs, WLAs

established in the absence of TMDLs, and preliminary WLAs for all discharges of a BCC to the Great Lakes system shall be set equal to the most stringent applicable water quality criterion or value for the BCC.

(E) The commissioner may grant mixing zones for any existing discharge of a BCC to the Great Lakes system beyond the date specified in clause (D) where it can be demonstrated, on a case-by-case basis, that failure to grant a mixing zone would preclude water conservation measures that would lead to the overall load reduction of the BCC, even though higher concentrations of the BCC occur in the effluent. Such mixing zones must also be consistent with subdivisions (2) and (3).

(F) The commissioner may grant mixing zones, consistent with subdivisions (2) and (3), beyond the date specified in clause (D) for any existing discharge of a BCC to the Great Lakes system upon the request of a discharger subject to the following limited circumstances:

(i) The commissioner determines the following:

(AA) The discharger is in compliance with and will continue to implement all applicable technology-based treatment and pretreatment requirements of Sections 301, 302, 304, 306, 307, 401, and 402 of the CWA, and is in compliance with its existing NPDES water quality-based effluent limitations, including those based on a mixing zone.

(BB) The discharger has reduced and will continue to reduce the loading of the BCC for which a mixing zone is requested to the maximum extent possible.

(ii) In making the determination in item (i), the commissioner shall consider the following information submitted by the discharger:

(AA) The availability, feasibility, cost effectiveness, and environmental benefits of additional controls or pollution prevention measures for reducing and ultimately eliminating the BCC for that discharger, including those used by similar dischargers. As used in this item, "pollution prevention" has the meaning set forth in the federal Pollution Prevention Act of 1990 (42 ~~USCA~~ **U.S.C.** 13101 ~~to 42 USCA 13109).~~ **et seq.).**

(BB) Whether the discharger or affected communities will suffer unreasonable economic effects if the mixing zone is eliminated.

(CC) The extent to which the discharger will implement an ambient monitoring plan to ensure compliance with water quality criteria at the edge of any authorized mixing zone or to ensure consistency with any applicable TMDL or such other strategy consistent with this section.

(DD) Other information the commissioner deems appropriate.

(iii) Any exceptions to the mixing zone elimination provision for an existing discharge of a BCC granted under this clause shall comply with the following:

(AA) Not result in any less stringent limitations than those existing upon or after the effective date of this rule.

(BB) Not likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the Endangered Species Act (ESA) or result in the destruction or adverse modification of such species' critical habitat.

(CC) Be limited to one (1) permit term unless the commissioner makes a new determination in accordance with this subdivision for each successive permit application in which a mixing zone for the BCC is sought.

(DD) Reflect all information relevant to the size of the mixing zone considered under item (ii).

(EE) Protect all designated and existing uses of the receiving water.

(FF) Meet all applicable aquatic life, wildlife, and human health criteria and values at the edge of the mixing zone and, as appropriate, within the mixing zone or be consistent with any appropriate TMDL or such other strategy consistent with this section.

(GG) Ensure the discharger has developed and conducted a pollutant minimization program for the BCC if required to do so under section 11.6 of this rule.

(HH) Ensure that alternative means for reducing BCCs elsewhere in the watershed are evaluated.

(G) For each draft NPDES permit that would allow a mixing zone for one (1) or more BCCs after January 1, 2004, the fact sheet or statement of basis for the draft permit, shall:

(i) specify the mixing provisions used in calculating the permit limits; and

(ii) identify each BCC for which a mixing zone is proposed.

(2) The following addresses conditions for deriving TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs for open waters of Lake Michigan, inland lakes, and other waters of the Great Lakes system with no appreciable flow relative to their volumes:

(A) For discharges into the open waters of Lake Michigan, the following requirements apply:

(i) To prevent acute toxicity to aquatic life, WLAs established in a TMDL, WLAs in the absence of a TMDL, and preliminary WLAs shall be determined as follows:

(AA) For allocations based on **an** acute aquatic life ~~criteria~~ **criterion** or ~~values,~~ **value,** the CMC **or SMC** shall not be exceeded outside the zone of initial dilution and the final acute value (FAV) shall not be exceeded in the undiluted discharge, unless a mixing zone demonstration is conducted and approved under subdivision (4), in which case the CMC **or SMC** shall be met outside the ~~alternative~~ **applicable alternate** mixing zone.

(BB) For allocations implementing ~~an~~ **the narrative** acute whole effluent toxicity (WET) criterion, 1.0 TU_a shall not be exceeded in the undiluted discharge, unless a mixing zone demonstration is conducted and approved ~~pursuant to~~ **under** subdivision (4), in which case 0.3 TU_a shall be met outside the ~~alternative~~ **applicable alternate** mixing zone.

(ii) To prevent chronic toxicity to aquatic life, human health, and wildlife, WLAs established in a TMDL, WLAs in the absence of a TMDL, and preliminary WLAs shall be determined as follows:

(AA) For allocations based on **a** chronic ~~criteria~~ **criterion** or ~~values~~ **value** (CCC or ~~SCV,~~ **SCC;** HNC or HNV; HCC or HCV; or WC or WV), the chronic ~~criteria~~ **criterion** or value shall not be exceeded in the undiluted discharge unless ~~an alternative~~ **a** mixing zone ~~is demonstrated as appropriate in a mixing zone~~ demonstration **is** conducted ~~pursuant to~~ **and approved under** subdivision (4), **in which case the chronic criterion or value shall be met outside the applicable alternate mixing zone.**

(BB) For allocations implementing ~~a~~ **the narrative** chronic **whole** effluent toxicity (WET) criterion, 1.0 TU_c shall not be exceeded in the undiluted discharge unless ~~an alternative~~ **a** mixing zone ~~is demonstrated as appropriate in a mixing zone~~ demonstration **is** conducted ~~pursuant to~~ **and approved under** subdivision (4), in which case 1.0 TU_c shall be met outside the ~~discharge-induced~~ **applicable alternate** mixing zone.

(iii) WLAs established in a TMDL, WLAs in the absence of a TMDL, and preliminary WLAs based on the criterion for sulfates, total dissolved solids**,** fluorides, or dissolved iron under 327 IAC 2-1.5-8(j) shall ensure that the ~~criteria~~ **criterion** not be exceeded in the undiluted discharge unless ~~an alternative~~ **a** mixing zone ~~is demonstrated as appropriate in a mixing zone~~ demonstration **is** conducted ~~pursuant to~~ **and approved under** subdivision (4), **in which case the criterion shall be met outside the applicable alternate mixing zone.**

(iv) If mixing zones from two (2) or more proximate sources interact or overlap, the combined effect must be evaluated to ensure that applicable criteria and values will be met in the area where any applicable mixing zones overlap.

(v) In no case shall a mixing zone be granted that exceeds the area where discharge-induced mixing occurs.

(B) For discharges into inland lakes and other waters of the Great Lakes system with no appreciable flow relative to their volumes (other than the open waters of Lake Michigan), no mixing zone will be allowed and water quality criteria **or values** will apply to the undiluted discharge.

(C) Appropriate mixing zone assumptions to be used in calculating load allocations for nonpoint sources shall be determined on a case-by-case basis.

(D) In no case shall a mixing zone be granted that would likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the ESA or result in the destruction or adverse modification of such species' critical habitat.

(3) The following describes conditions for deriving TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs for tributaries of the Great Lakes system that exhibit appreciable flows relative to their volumes:

(A) The following stream design flows shall be used unless data exist to demonstrate that an alternative stream design flow is appropriate for stream-specific and pollutant-specific conditions:

(i) For purposes of calculating a TMDL, WLAs in the absence of a TMDL, or preliminary WLAs, using a steady-state model, the stream design flows shall be as follows:

(AA) For an acute aquatic life criterion or value, ~~or an acute aquatic WET criterion, when a high rate diffuser is used,~~ the one (1) day, ten (10) year stream design flow ($Q_{1,10}$).

(BB) To implement the narrative acute WET criterion, when a high rate diffuser is used, the one (1) day, ten (10) year stream design flow ($Q_{1,10}$).

~~(BB)~~ **(CC)** For a chronic aquatic life criterion or value, ~~or a chronic aquatic WET criterion,~~ the seven (7) day, ten (10) year stream design flow ($Q_{7,10}$).

(DD) To implement the narrative chronic WET criterion, the seven (7) day, ten (10) year stream design flow ($Q_{7,10}$).

~~(CC)~~ **(EE)** For a drinking water human health criterion or value, the harmonic mean flow at the point of ~~drinking~~ **the public**

water **system** intake.

~~(DD)~~ **(FF)** For a nondrinking water human health criterion or value, the harmonic mean flow at the point of discharge.

~~(EE)~~ **(GG)** For a wildlife criterion or value, the ninety (90) day, ten (10) year **stream design** flow ($Q_{90,10}$).

(ii) TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs calculated using dynamic modelling do not need to incorporate the stream design flows specified in item (i).

(iii) TMDLs, WLAs in the absence of TMDLs, and preliminary WLAs calculated for intermittent or controlled discharges may use alternate stream design flows if these alternate design flows will ensure compliance with water quality criteria **and values.**

(B) To prevent acute toxicity, WLAs and LAs established in a TMDL, WLAs in the absence of a TMDL, and preliminary WLAs shall be determined as follows:

(i) For allocations based on **an** acute aquatic life ~~criteria~~ **criterion** or ~~values,~~ **value, the CMC or SMC shall not be exceeded outside the zone of initial dilution and** the final acute value (FAV) shall not be exceeded in the undiluted discharge unless ~~the discharger utilizes a submerged, high rate diffuser outfall structure (or the functional equivalent) that provides turbulent initial mixing and minimizes organism exposure time; and~~ a mixing zone demonstration is conducted and approved under subdivision (4), in which case the CMC **or SMC** shall be met outside the ~~discharge-induced~~ **applicable alternate** mixing zone.

(ii) For allocations implementing ~~an~~ **the narrative** acute whole effluent toxicity (WET) criterion, 1.0 TU_a shall not be exceeded in the undiluted discharge unless ~~the discharger utilizes a submerged, high rate diffuser outfall structure (or the functional equivalent) that provides turbulent initial mixing and minimizes organism exposure time; and~~ a mixing zone demonstration is conducted and approved under subdivision (4), in which case 0.3 TU_a shall be met outside the ~~discharge-induced~~ **applicable alternate** mixing zone.

(C) To protect aquatic life, wildlife, and human health from chronic effects, including chronic whole effluent toxicity, WLAs and LAs established in a TMDL, WLAs in the absence of a TMDL, and preliminary WLAs shall be calculated using a dilution fraction no greater than twenty-five percent (25%) of the stream design flow unless a mixing zone demonstration under subdivision (4) is conducted and approved.

(D) If mixing zones from two (2) or more proximate sources interact or overlap, the combined effect must be evaluated to ensure that applicable criteria and values will be met in the area where any applicable mixing zones overlap.

(E) In no case shall a permitting authority grant a mixing zone that would likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the ESA or result in the destruction or adverse modification of such species' critical habitat.

(4) An alternate mixing zone that is allowed under subdivision (2) or (3) may be granted upon the request of the discharger subject to the following requirements:

(A) **Alternate mixing zones are granted on a pollutant-by-pollutant and criterion-by-criterion basis.** Any discharger seeking a mixing zone other than that specified by subdivision (2) or (3) shall submit an application for ~~a~~ **an alternate** mixing zone ~~demonstration~~ for consideration by the commissioner. The alternate mixing zone application must do the following:

(i) Document the characteristics and location of the outfall structure, including whether technologically-enhanced mixing will be utilized.

(ii) Document the amount of dilution occurring at the boundaries of the proposed mixing zone and the size, shape, and location of the area of mixing, including the manner in which diffusion and dispersion occur.

(iii) For sources discharging to the open waters of Lake Michigan, define the location at which discharge-induced mixing ceases.

(iv) For sources discharging to tributaries of the Great Lakes system that exhibit appreciable flows relative to their volumes and seeking an alternate mixing zone for an acute aquatic life criterion or value or for acute whole effluent toxicity (WET), define the location at which discharge-induced mixing ceases under stream design flow conditions.

~~(iv)~~ **(v)** Document the physical, including substrate character and geomorphology, chemical, and biological characteristics of the receiving waterbody, including whether the receiving waterbody supports indigenous, endemic, or naturally occurring species.

~~(v)~~ **(vi)** Document the physical, chemical, and biological characteristics of the effluent.

~~(vi)~~ **(vii)** Document the synergistic effects of overlapping mixing zones or the aggregate effects of adjacent mixing zones.

~~(vii)~~ **(viii)** Show whether organisms would be attracted to the area of mixing as a result of the effluent character.

(B) The commissioner may grant the alternate mixing zone if the discharger demonstrates the following:

(i) The mixing zone would not interfere with or block passage of fish or aquatic life.

(ii) The level of the pollutant permitted in the waterbody would not likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the ESA or result in the destruction or adverse modification of such species' critical habitat.

(iii) The mixing zone would not extend to drinking water intakes.

(iv) The mixing zone would not impair or otherwise interfere with the designated or existing uses of the receiving water or downstream waters.

(v) The mixing zone would not promote undesirable aquatic life or result in a dominance of nuisance species.

(vi) By allowing the additional mixing:

(AA) substances will not settle to form objectionable deposits;

(BB) floating debris, oil, scum, and other matter in concentrations that form nuisances will not be produced; and

(CC) objectionable color, odor, taste, or turbidity will not be produced.

(C) In no case shall an alternate mixing zone for an acute aquatic life criterion or value or for acute whole effluent toxicity (WET) be granted unless the discharger utilizes a submerged, high rate diffuser outfall structure (or the functional equivalent) that provides turbulent initial mixing and minimizes organism exposure time.

(D) In no case shall an alternate mixing zone for an acute aquatic life criterion or value or for acute whole effluent toxicity (WET) be granted that exceeds the area where discharge-induced mixing occurs.

~~(C)~~ **(E)** In no case shall ~~a~~ **an alternate** mixing zone for a discharge into the open waters of Lake Michigan be granted that exceeds the area where discharge-induced mixing occurs.

~~(D)~~ **(F)** Upon receipt of an application for an alternate mixing zone, ~~demonstration,~~ the commissioner shall provide notice, request comment, and, if requested, schedule and hold a public meeting on the application in accordance with section 11.2 of this rule.

(5) Except for discharges into the open waters of Lake Michigan, notwithstanding subdivisions (2) ~~(3), and~~ **through** (4), the commissioner may deny any mixing zone for a discharge, **for certain substances in a discharge,** or for a criterion **or value** for any substance in a discharge based upon a determination of adverse human health, aquatic life, or wildlife effects. The commissioner shall identify and document the rationale for this decision.

(6) For discharges into the open waters of Lake Michigan, if all of the conditions for approval of an alternate mixing zone are met in accordance with subdivision (4), the alternate mixing zone shall be granted unless the commissioner determines that the mixing zone should be denied based upon a consideration of harm to human health, aquatic life, or wildlife. The commissioner shall evaluate all available information, including information submitted by the public, relevant to the consideration of harm to human health, aquatic life, or wildlife. The commissioner shall identify the harm to human health, aquatic life, or wildlife, and document the rationale for this decision.

(7) The commissioner's evaluation of a mixing zone for a discharge into the open waters of Lake Michigan under subdivisions (2), (4), and (6) shall constitute the evaluation required by IC 13-18-4-7. Any decision regarding the granting or denial of a mixing zone for a discharge into Lake Michigan shall be included in the public notice of the tentative decision on the draft new, renewed, or modified permit. The basis for the tentative decision, including the commissioner's rationale for concluding whether or not the requirements of IC 13-18-4-7 are satisfied, shall be included in the briefing memo or fact sheet that accompany the tentative decision on the draft new, renewed, or modified permit.

(c) Wasteload allocations calculated in the absence of a TMDL and preliminary WLAs shall be determined using the conservation of mass equations as follows unless an alternate methodology is approved by the commissioner:

(1) For the calculations contained within this subsection, the following apply:

(A) WQC_c = The chronic water quality criterion or value. A chronic water quality criterion or value is any of the following:

(i) Criterion continuous concentration (CCC) or secondary ~~chronic value (SCV).~~ **continuous concentration (SCC). If the CCC or SCC for a metal is expressed in the form of dissolved metal, the CCC or SCC shall be set equal to $C_{instream}$ determined for the CCC or SCC in accordance with subdivision (6).**

(ii) **The numeric interpretation of the narrative chronic** WET criterion ~~in chronic toxic units~~ (1.0 TU_c).

(iii) Human noncancer criterion (HNC) or human noncancer value (HNV).

(iv) Human cancer criterion (HCC) or human cancer value (HCV).

(v) Wildlife criterion (WC) or wildlife value (WV).

(vi) The ~~criteria~~ **criterion** for sulfates, total dissolved solids, fluorides, ~~and~~ **or** dissolved iron under 327 IAC 2-1.5-8(j).

(B) WQC_a = The criterion maximum concentration (CMC) or secondary ~~acute value (SAV)~~ **maximum concentration (SMC)** or, **if a mixing zone demonstration for acute WET is conducted and approved under subsection (b)(4),** three-tenths (0.3) TU_a for WET. **If the CMC or SMC for a metal is expressed in the form of dissolved metal, the CMC or SMC shall be set equal to $C_{instream}$ determined for the CMC or SMC in accordance with subdivision (6).**

(C) FAV = Final acute value = two (2) times the CMC or ~~SAV.~~ **SMC. If the CMC or SMC for a metal is expressed in the form of dissolved metal, the FAV shall equal two (2) times $C_{instream}$ determined for the CMC or SMC in accordance with subdivision (6).**

(D) Q_e = The facility effluent flow as determined by subsection (a)(9).

(E) Q_w = The portion of the receiving waterbody allocated for mixing ~~pursuant to~~ **under** subsection (b). **If C_b is greater than the water quality criterion or value, a value of zero (0) shall be used for Q_w.**

(F) C_b = The representative background concentration determined by subsection (a)(8).

(G) MR = Mixing zone ratio $= \frac{Q_w}{Q_e}$.

(H) Q_z = The **portion of the receiving waterbody allocated for mixing in the** zone of initial dilution. **For discharges into tributaries that exhibit appreciable flows relative to their volumes, $Q_z = Q_e$ or the $Q_{1,10}$, whichever is less. For discharges into the open waters of Lake Michigan, $Q_z = Q_e$. If C_b is greater than WQC_a, a value of zero (0) shall be used for Q_z.**

(2) Wasteload allocations for discharges into tributaries that exhibit appreciable flows relative to their volumes based on protection from acute aquatic effects shall be determined as follows:

(A) For a discharge without a high rate diffuser (or its functional equivalent), the equation resulting in the lesser WLA shall be used:

(i) WLA = FAV (or 1.0 TU_a for WET); or

(ii) $$WLA = \frac{WQC_a(Q_e + Q_z) - (Q_z)(C_b)}{Q_e}$$

(B) For a discharge with a high rate diffuser (or its functional equivalent), the following equation shall be used:

$$WLA = \frac{WQC_a(Q_e + Q_w) - (Q_w)(C_b)}{Q_e}$$

(3) Wasteload allocations for tributaries that exhibit appreciable flows relative to their volumes based on protection from chronic effects shall be determined as follows:

$$WLA = \frac{WQC_c(Q_e + Q_w) - (Q_w)(C_b)}{Q_e}$$

(4) Wasteload allocations for discharges into the open waters of Lake Michigan based on protection from acute aquatic effects shall be determined as follows:

(A) For a discharge without an approved alternate mixing zone, the equation resulting in the lesser WLA shall be used:

(i) WLA = FAV (or 1.0 TU_a for WET); or

(ii) $$WLA = \frac{WQC_a(Q_e + Q_z) - (Q_z)(C_b)}{Q_e}$$

(B) For a discharge with an approved alternate mixing zone, the following equation shall be used:

$$WLA = (WQC_a)(1 + MR) - (C_b)(MR)$$

(5) Wasteload allocations for the open waters of Lake Michigan based on protection from chronic effects shall be determined as follows:

$$WLA = (WQC_c)(1 + MR) - (C_b)(MR)$$

(6) The following procedures shall be used to calculate $C_{instream}$, the total recoverable metal concentration outside the mixing zone that equates to an acute or chronic aquatic water quality criterion or value expressed in the form of dissolved metal:

(A) For a CMC or SMC expressed in the form of dissolved metal, $C_{instream}$ shall be calculated by dividing the CMC or SMC by the acute translator found in clause (D).

(B) For a CCC or SCC expressed in the form of dissolved metal, $C_{instream}$ shall be calculated by dividing the CCC or SCC by the chronic translator found in clause (D).

(C) If all approved analytical methods for the metal inherently measure only its dissolved form, such as hexavalent chromium, $C_{instream}$ shall not be calculated and the acute and chronic aquatic water quality criteria or values expressed in the form of dissolved metal shall be used in the calculation of WLAs.

(D) Unless a site-specific translator is determined in accordance with clause (E), the following translators shall be used:

Table 11.4-2

Metals Translators

Dissolved to Total Recoverable

Substances	Acute Translators	Chronic Translators
Arsenic (III)	1.000	1.000
Cadmium	1.136672-[(ln hardness)(0.041838)]	1.101672-[(ln hardness)(0.041838)]
Chromium (III)	0.316	0.860
Copper	0.960	0.960
Mercury	0.85	0.85
Nickel	0.998	0.997
Selenium	0.922	0.922
Zinc	0.978	0.986

(E) A discharger or proposed discharger may request the use of an alternate translator by using site-specific data. The discharger must conduct a site-specific study to identify the ratio of the dissolved fraction to the total recoverable fraction for a metal in the receiving waterbody outside the mixing zone. If the discharger provides an acceptable study, and other provisions of 327 IAC 2-1.5 and this article are satisfied (such as antibacksliding and antidegradation), the commissioner shall use the site-specific translator. A translator derived for one (1) discharge into a waterbody segment may be applied to other discharges on the same waterbody segment if the translator would adequately represent the site-specific conditions applicable to the other discharges.

(d) Notwithstanding this section, the pollutants contained in this subsection shall be addressed as follows:

(1) The pH requirements contained in 327 IAC 2-1.5-8(c)(2) and 327 IAC 2-1.5-8(j) apply to the undiluted discharge.

(2) The bacteriological criteria contained in 327 IAC 2-1.5-8(e) apply to the undiluted discharge.

(3) Models, approved by the commissioner, that ensure compliance with the applicable water quality criteria for the following parameters shall be used:

(A) Dissolved oxygen criteria contained in 327 IAC 2-1.5-8(c)(3), 327 IAC 2-1.5-8(d)(1), and 327 IAC 2-1.5-8(j).

(B) Thermal requirements contained in 327 IAC 2-1.5-8(c)(4) and 327 IAC 2-1.5-8(d)(2).

(C) Criteria for the protection of public water supplies contained under 327 IAC 2-1.5-8(f).

(D) Criteria for the protection of industrial water supplies contained in 327 IAC 2-1.5-8(g).

(Water Pollution Control Board; 327 IAC 5-2-11.4; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1441; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3379)

SECTION 26. 327 IAC 5-2-11.5 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-11.5 Great Lakes system dischargers determination of reasonable potential to exceed water quality standards

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4

Sec. 11.5. (a) If the commissioner determines that a pollutant or pollutant parameter (either conventional, nonconventional, a toxic substance, or whole effluent toxicity) is or may be discharged into the Great Lakes system at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable narrative **criterion** or numeric water quality ~~criteria~~ **criterion** or value under 327 IAC 2-1.5, the commissioner shall incorporate WQBELs in an NPDES permit that will ensure compliance with the ~~criteria~~ **criterion** or value. The commissioner shall exercise best professional judgment, taking into account the source and nature of the discharge, existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, and, where appropriate, the dilution of the effluent in the receiving water. In all cases, the commissioner shall use any valid, relevant, representative information pertaining to the discharge of the pollutant.

(b) If the commissioner determines that a substance is or may be discharged into the Great Lakes system at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any numeric criterion for a toxic substance contained in 327 IAC 2-1.5-8(b)(3), Table 8-1, 327 IAC 2-1.5-8(b)(5), Table 8-3, 327 IAC 2-1.5-8(b)(6), Table 8-4, a criterion for ammonia contained under 327 IAC 2-1.5-8(c)(5), a criterion for sulfates, total dissolved solids, fluorides, or dissolved iron under 327 IAC 2-1.5-8(j), or a Tier I criterion or Tier II value determined under 327 IAC 2-1.5-11 through 327 IAC 2-1.5-16, the commissioner shall incorporate WQBELs in an NPDES permit for the discharge of that pollutant, and in all cases, the commissioner shall use any valid, relevant, representative information pertaining to the discharge of the substance as follows:

(1) When facility-specific effluent monitoring data for a substance are available, the commissioner may take into account the source and nature of the discharge, existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, and, where appropriate, the dilution of the effluent in the receiving water in making the determination whether to develop preliminary effluent limitations (PELs) and comparing those effluent limitations to the projected effluent quality (PEQ) of the discharge in accordance with the following procedures:

(A) The commissioner shall develop PELs for the discharge of a pollutant from a point source using the following procedures:

(i) The commissioner shall develop preliminary WLAs for the discharge of the pollutant from the point source to protect human health, wildlife, acute aquatic life, and chronic aquatic life, based upon the following:

(AA) Any existing numeric criterion for a toxic substance contained in 327 IAC 2-1.5-8(b)(3), Table 8-1, 327 IAC 2-1.5-8(b)(5), Table 8-3, 327 IAC 2-1.5-8(b)(6), Table 8-4, or 327 IAC 2-1.5-8(c)(5) **or a site-specific modification to an existing numeric criterion calculated under 327 IAC 2-1.5-16.**

(BB) Where there is no existing numeric criterion, the commissioner shall calculate a Tier I criterion for such substance for the protection of human health, wildlife, and aquatic life using the methodologies under 327 IAC 2-1.5-11 (aquatic life), 327 IAC 2-1.5-14 (human health), 327 IAC 2-1.5-15 (wildlife), and 327 IAC 2-1.5-16 (site-specific modifications).

(CC) Where there is insufficient data to calculate a Tier I criterion, the commissioner shall calculate a Tier II value for such substance for the protection of human health and aquatic life using the methodologies under 327 IAC 2-1.5-12 (aquatic life), 327 IAC 2-1.5-14 (human health), and 327 IAC 2-1.5-16 (site-specific modifications).

(DD) Where there is insufficient data to calculate a Tier II value, the commissioner shall apply the procedure in subdivision (3) to determine whether data must be generated to calculate a Tier II value.

(ii) The commissioner shall develop **a** preliminary ~~WLAs~~ **WLA** for the discharge of sulfates, total dissolved solids, fluorides, or dissolved iron, in addition to the preliminary WLAs developed for ~~these parameters~~ **the parameter** under item (i), based on the numeric ~~criteria~~ **criterion** for ~~these substances~~ **the substance** under 327 IAC 2-1.5-8(j) when applicable.

(iii) Section 11.4(c) of this rule shall be used as the basis for determining preliminary WLAs in accordance with items (i) and (ii).

(iv) The commissioner shall ~~develop PELs consistent with~~ **use** the preliminary WLAs developed under items (i) through (iii)

~~and~~ **to develop monthly and daily PELs** in accordance with the ~~procedures~~ **procedure** for converting WLAs into WQBELs under section ~~11.6~~ **11.6(c)** of this rule.

(B) The commissioner shall determine the projected effluent quality (PEQ) as follows:

(i) When monthly average data are available, **calculated using** at least ~~three (3)~~ **two (2)** data points over the period of a month, the monthly PEQ shall be determined as follows:

(AA) The commissioner shall identify the number of monthly averages of the effluent data and the coefficient of variation of the monthly averages of the effluent data.

(BB) The commissioner shall obtain the appropriate multiplying factor from ~~Table 11.5-1 in~~ subsection (h) based on the information obtained in subitem (AA).

(CC) The maximum of the monthly average values shall be multiplied by the multiplying factor determined under subitem (BB) to determine the monthly PEQ.

(ii) When monthly average data ~~is~~ **are** not available, the monthly PEQ shall be identical to the daily PEQ determined under item (iii). An alternate method of ~~determining the~~ **calculating** monthly ~~PEQ~~ **averages** may be used if the applicant demonstrates that this alternate method results in ~~a~~ monthly ~~PEQ~~ **averages** representative of actual conditions at the facility. **Monthly averages calculated under this item shall be used to determine the monthly PEQ using the procedure in item (i).**

(iii) The daily PEQ shall be determined as follows:

(AA) The commissioner shall identify the number of daily effluent samples and the coefficient of variation of the daily effluent samples.

(BB) The commissioner shall obtain the appropriate multiplying factor from ~~Table 11.5-1 in~~ subsection (h) based on the information obtained in subitem (AA).

(CC) The maximum of the daily effluent samples shall be multiplied by the multiplying factor determined under subitem (BB) to determine the daily PEQ.

(iv) The coefficient of variation shall be calculated as the ratio of the standard deviation of the daily or monthly effluent data divided by the arithmetic average of the effluent data, except that where there are fewer than ten (10) data points the coefficient of variation shall be specified as six-tenths (0.6).

(v) In lieu of the procedures under items (i) through (iv), the commissioner shall allow the use of an alternate procedure for the determination of the PEQ if the applicant demonstrates that the alternate statistical procedure meets the following: ~~criteria:~~

(AA) Is a scientifically defensible statistical method.

(BB) Specifies the daily PEQ as the ninety-fifth percentile of the distribution of the projected population of daily values of the facility-specific effluent monitoring data.

(CC) Specifies the monthly PEQ as the ninety-fifth percentile of the distribution of the projected population of monthly average values of the facility-specific effluent monitoring data.

(DD) Accounts for and captures the long term daily and monthly variability of the effluent quality.

(EE) Accounts for limitations associated with sparse data sets.

(FF) Assumes a lognormal distribution of the facility-specific effluent data unless otherwise shown by the effluent data set.

(C) The commissioner shall establish WQBELs in the NPDES permit for each substance that:

(i) the monthly PEQ developed under clause (B) exceeds the monthly PEL developed under clause (A); or

(ii) the daily PEQ developed under clause (B) exceeds the daily PEL developed under clause (A).

(D) If facility-specific effluent monitoring data for a metal are available in the form of dissolved metal and the PELs for the metal developed under clause (A) are based on an acute or chronic aquatic water quality criterion or value expressed in the form of dissolved metal, the commissioner shall make the determination under clause (C) using PEQs and PELs in the form of dissolved metal if the following conditions are satisfied:

(i) The discharger provides an acceptable site-specific study that shows that the metal in the effluent does not become more dissolved in the receiving waterbody outside the mixing zone.

(ii) Representative data are available from the receiving waterbody to calculate the background concentration of the metal in accordance with section 11.4(a)(8) of this rule and, if applicable, the hardness of the receiving waterbody in accordance with section 11.4(a)(13) of this rule.

(iii) The facility-specific effluent monitoring data in the form of dissolved metal are representative of the magnitude

and variability of the metal in the effluent.

(iv) The PEQs in the form of dissolved metal are determined under clause (B) using the effluent monitoring data in item (iii).

(v) The PELs in the form of dissolved metal are developed as follows:

(AA) Preliminary WLAs in the form of dissolved metal are developed consistent with section 11.4(c) of this rule and using the receiving waterbody data in item (ii) to protect acute and chronic aquatic life.

(BB) The preliminary WLAs in subitem (AA) are used to develop monthly and daily PELs in accordance with section 11.6(c) of this rule.

(vi) A determination under clause (C) using PEQs and PELs developed under this item in the form of total recoverable metal shows that the commissioner is not required to establish WQBELs in the NPDES permit for the metal. The PEQs and PELs shall be developed as follows:

(AA) PEQs in the form of total recoverable metal shall be determined under clause (B) using facility-specific effluent monitoring data in the form of total recoverable metal that is comparable to the data in item (iii).

(BB) Monthly and daily PELs in the form of total recoverable metal shall be developed using preliminary WLAs developed under section 11.4(c) of this rule for all the applicable criteria and values for the metal that are expressed in the form of total recoverable metal and in accordance with section 11.6(c) of this rule. The preliminary WLAs shall be calculated using the receiving waterbody data in item (ii).

(2) When facility-specific effluent monitoring data for a substance are not available, the commissioner shall exercise best professional judgment, taking into account the source and nature of the discharge, existing controls on point and nonpoint sources of pollution, and, where appropriate, the dilution of the effluent in the receiving water:

(A) for a new Great Lakes discharger, to develop an estimated monthly and daily PEQ necessary to make a determination under this subsection; or

(B) for an existing Great Lakes discharger, to determine whether it is necessary to require the applicant to collect the data required to make a determination under this subsection.

(3) The commissioner shall develop the necessary data to calculate Tier II values where such data does not currently exist as follows:

(A) Except as provided in clauses (B) and (D) or subdivision (4), for each toxic substance that a permittee reports as known or believed to be present in its effluent, or that the commissioner reasonably believes may be present in the effluent, and for which pollutant data sufficient to calculate Tier II values for noncancer human health, acute aquatic life, or chronic aquatic life do not exist, the commissioner shall take the following actions:

(i) For those effects (noncancer human health, acute aquatic life, or chronic aquatic life) for which sufficient data do not exist, the commissioner shall use all available, relevant information, including quantitative structure activity relationship (QSAR) information and other relevant toxicity information, to estimate ambient screening values for such pollutant that will protect humans from health effects other than cancer, and aquatic life from acute and chronic effects.

(ii) Using the procedures under subdivision ~~(1)(A),~~ **(1),** the commissioner shall develop PELs for the discharge of the pollutant from the point source to protect human health, acute aquatic life, and chronic aquatic life based upon the estimated ambient screening values.

(iii) The commissioner shall compare the PEQs developed according to the procedures under subdivision ~~(1)(B)~~ **(1)** to the PELs developed under item (ii). If the monthly or daily PEQ exceeds the respective monthly or daily PEL, the commissioner shall generate or require the permittee to generate the data necessary to derive Tier II values for noncancer human health, acute aquatic life, and chronic aquatic life.

(iv) The data generated under item (iii) shall be used in calculating a Tier II value as required under subdivision (1). The calculated Tier II value shall be used in calculating the PELs under subdivision ~~(1)(A).~~ **(1).** These PELs shall be used for purposes of determining whether a WQBEL must be included in the permit under subdivision ~~(1)(C).~~ **(1).**

(B) With the exception of bioaccumulative chemicals of concern (BCCs), the commissioner is not required to apply the procedures under clause (A) or include WQBELs to protect aquatic life for any pollutant discharged by an existing point source into the Great Lakes system if the following occur:

(i) There is insufficient data to calculate a Tier I criterion or Tier II value for aquatic life for the pollutant.

(ii) The permittee has demonstrated that the whole effluent does not exhibit acute or chronic toxicity.

(iii) The permittee has demonstrated, through a biological assessment, that there are no acute or chronic effects on aquatic life

in the receiving water. ~~Upon request by the permittee, the commissioner may determine that a biological assessment is not necessary to evaluate the impact of the pollutant on the receiving stream after considering:~~

~~(AA) the characteristics of the pollutant;~~

~~(BB) the concentration of the pollutant in the effluent;~~

~~(CC) the effluent flow; and~~

~~(DD) the biological and physical characteristics of the receiving waterbody.~~

(C) Nothing in clause (A) or (B) shall preclude or deny the right of the commissioner to:

(i) determine, in the absence of the data necessary to derive a Tier II value, that the discharge of the pollutant will cause, have the reasonable potential to cause, or contribute to an excursion above a narrative criterion for water quality; and

(ii) incorporate a WQBEL for the pollutant into an NPDES permit.

(D) If the commissioner develops a WQBEL consistent with clause (C) that is at least as stringent as a WQBEL that would have been developed based upon the Tier II value or values for that pollutant, the commissioner may require the permittee to generate the data necessary to derive a Tier II value or values for that pollutant.

(4) The determinations under this subdivision shall be made on a pollutant-by-pollutant, outfall-by-outfall basis. This subdivision applies only in the absence of an EPA-approved TMDL applicable to the discharge or in the absence of an assessment and remediation plan submitted and approved in accordance with section 11.4(a)(2) of this rule. The following procedures shall be used in the consideration of intake pollutants in determining reasonable potential:

(A) As used in this subdivision and section 11.6(i) of this rule, "intake pollutant" means a pollutant that is present in waters of the state at the time it is withdrawn from such waters by the discharger or other facility, such as a public water ~~supply;~~ **system** supplying the discharger with intake water.

(B) As used in this subdivision, **subsection (g),** and section 11.6(i) of this rule, an intake pollutant is considered to be from the same body of water as the discharge if the following conditions exist:

(i) The commissioner finds that the intake pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had it not been removed by the permittee. This finding may be deemed established if:

(AA) the representative background concentration of the pollutant in the receiving water, as determined under section 11.4(a)(8) of this rule, (excluding any amount of the pollutant in the facility's discharge) is similar to or greater than that in the intake water;

(BB) there is a direct hydrological connection between the intake and discharge points (the water at the point of intake naturally flows toward the water at the point of discharge); and

(CC) any difference in a water quality characteristic (such as temperature, pH, and hardness) between the intake and receiving waters does not result in an adverse impact on the receiving water.

(ii) The commissioner may also consider other site-specific factors relevant to the transport and fate of the pollutant to make the finding in a particular case that a pollutant would or would not have reached the vicinity of the outfall point in the receiving water within a reasonable period had it not been removed by the permittee.

(iii) An intake pollutant from ground water may be considered to be from the same body of water if the commissioner determines that the pollutant would have reached the vicinity of the outfall point in the receiving water within a reasonable period had it not been removed by the permittee, except that such a pollutant is not from the same body of water to the extent that the ground water contains the pollutant partially or entirely due to human activity, such as industrial, commercial, or municipal operations, disposal actions, or treatment processes.

(iv) Notwithstanding any other provision in this clause, an intake pollutant shall be considered to be from the same body of water if the permittee's intake point is located on Lake Michigan and the outfall point is located on a tributary of Lake Michigan and the following conditions are met:

(AA) The representative background concentration of the pollutant in the receiving water, as determined under section 11.4(a)(8) of this rule, (excluding any amount of the pollutant in the facility's discharge) is similar to or greater than that in the intake water.

(BB) Any difference in a water quality characteristic (such as temperature, pH, and hardness) between the intake and receiving waters does not result in an adverse impact on the receiving water.

(C) The commissioner may use the procedure to determine reasonable potential described in this subdivision in lieu of the procedures contained under subdivisions (1) through (3) provided the following conditions are met:

(i) The commissioner may determine that there is no reasonable potential for the discharge of an intake pollutant or pollutant

parameter to cause or contribute to an excursion above a narrative **criterion** or numeric water quality criterion ~~within an applicable water quality standard~~ **or value under 327 IAC 2-1.5** when a discharger demonstrates to the satisfaction of the commissioner (based upon information provided in the permit application or other information deemed necessary by the commissioner) that:

(AA) the facility does not contribute any additional mass of the intake pollutant to its wastewater;

(BB) the facility withdraws one hundred percent (100%) of the intake water containing the pollutant from the same body of water into which the discharge is made;

(CC) the facility does not alter the intake pollutant chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream;

(DD) the facility does not cause an increase in the intake pollutant concentration at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the pollutant concentration in the intake waterbody unless the increased concentration does not cause or contribute to an excursion above an applicable water quality ~~standard;~~ **criterion or value;** and

(EE) the timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the intake pollutant were left in the waterbody.

(ii) If a discharge of an intake pollutant or pollutant parameter is not able to qualify under item (i), the commissioner may decide not to impose WQBELs on the discharge, if the following conditions are met:

(AA) The discharge consists of one (1) or more internal wastestreams that do qualify (qualifying wastestreams) under item (i) and one (1) or more internal wastestreams that do not qualify (nonqualifying wastestreams) under item (i).

(BB) For nonqualifying wastestreams composed entirely of storm water, the permittee accepts permit conditions for the storm water wastestream that the commissioner determines to be necessary to protect the water quality of the receiving waterbody. The requirements imposed shall be as if the storm water wastestream discharged directly into the receiving waterbody and shall be consistent with requirements imposed on other similar storm water discharges to the waterbody.

(CC) For nonqualifying wastestreams not composed entirely of storm water, the permittee accepts WQBELs on each of the nonqualifying wastestreams that have a reasonable potential for the discharge of the intake pollutant or pollutant parameter to cause or contribute to an excursion above a narrative **criterion** or numeric water quality criterion **or value** as determined using the procedures under subdivisions (1) through (3). For purposes of determining reasonable potential and developing WQBELs for these nonqualifying wastestreams, the preliminary wasteload allocations and wasteload allocations in the absence of a TMDL shall be determined as if these nonqualifying wastestreams discharged directly into the receiving waterbody without combining with the qualifying wastestreams.

(iii) Upon a finding under item (i) or (ii) that a pollutant in the discharge does not cause, have the reasonable potential to cause, or contribute to an excursion above an applicable water quality ~~standard,~~ **criterion or value,** the commissioner is not required to include a WQBEL in the facility's permit for the intake pollutant provided:

(AA) the NPDES permit fact sheet or statement of basis includes a specific determination that there is no reasonable potential for the discharge of an intake pollutant to cause or contribute to an excursion above an applicable narrative **criterion** or numeric water quality criterion **or value** and references appropriate supporting documentation included in the administrative record;

(BB) the permit requires all influent, effluent, and ambient monitoring necessary to demonstrate that the conditions in item (i) or (ii) are maintained during the permit term; and

(CC) the permit contains a reopener clause authorizing modification or revocation and reissuance of the permit if new information indicates changes in the conditions under item (i) or (ii).

(iv) Absent a finding under item (i) or (ii) that the discharge of an intake pollutant or pollutant parameter does not cause, have the reasonable potential to cause, or contribute to an excursion above an applicable water quality criterion **or value,** the commissioner shall use the procedures contained under subdivisions (1) through (3) to determine whether the discharge of that pollutant causes, has the reasonable potential to cause, or contribute to an excursion above an applicable narrative **criterion** or numeric water quality criterion **or value.**

(5) Notwithstanding this subsection, if the commissioner determines that the geometric mean of a pollutant in fish tissue samples collected from a waterbody exceeds the tissue basis of a ~~toxic substance,~~ **water quality criterion or value,** after consideration of the variability of the pollutant's bioconcentration and bioaccumulation in fish, the following provisions apply:

(A) If such pollutant is a BCC, each facility that discharges detectable levels of the BCC to that water has the reasonable potential to cause or contribute to an excursion above a water quality criterion **or value** for that BCC and the commissioner shall

establish a WQBEL for such pollutant in the NPDES permit for each such facility.

(B) If such pollutant is not a BCC, the commissioner may determine that any or all of the facilities that discharge detectable levels of the pollutant to that water have the reasonable potential to cause or contribute to an excursion above a water quality criterion **or value** for that ~~toxic substance~~ **pollutant** and the commissioner shall establish a WQBEL for such pollutant in the NPDES permit for each such facility.

(c) Except as provided in subdivision (3), where the commissioner determines that the whole effluent toxicity (WET) of an effluent is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any numeric interpretation of a narrative WET criterion contained in 327 IAC 2-1.5-8, the commissioner shall incorporate WQBELs for WET in the NPDES permit and in all cases, the commissioner shall use any valid, relevant, or representative information pertaining to the discharge of WET as follows:

(1) When facility-specific WET effluent data are available, the commissioner may take into account the source and nature of the discharge, existing controls on point and nonpoint sources of pollution, the variability of the WET in the effluent, and, where appropriate, the dilution of the effluent in the receiving water in making the determination to develop effluent limitations for WET. The WET of an effluent is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable WET criterion contained under 327 IAC 2-1.5, when effluent-specific information demonstrates the following:

(A) The acute WET of an effluent is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above an applicable acute WET criterion applied to the undiluted discharge, when effluent-specific information demonstrates the following:

$$(TU_a)(F) \geq 0.2$$

Where: TU_a = The geometric mean of the measured acute toxicity values expressed in acute toxic units (TU_a or TU_c). Individual toxicity values may be estimated for the missing endpoint using a default acute-chronic ratio (ACR) of ten (10), when data exist for chronic WET, but not for acute WET.

F = Fraction of the measured toxicity values greater than the preliminary wasteload allocation for acute WET determined under section 11.4(c) of this rule (fraction failed).

(B) The acute WET of an effluent is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above an applicable acute WET criterion applied outside an alternate mixing zone, when effluent-specific information demonstrates the following:

$$F \geq 0.2$$

Where: F = Fraction of the measured toxicity values greater than the preliminary wasteload allocation for acute WET determined under section 11.4(c) of this rule (fraction failed). Individual toxicity values may be estimated for the missing endpoint using a default acute-chronic ratio (ACR) of ten (10), when data exist for chronic WET, but not for acute WET.

(C) The chronic WET of an effluent is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above an applicable chronic WET criterion, when effluent-specific information demonstrates the following:

$$\frac{(TU_c)(Q_e)(F)}{(Q_w + Q_e)} \geq 0.2$$

Where: TU_c = The geometric mean of the measured chronic toxicity values expressed in chronic toxic units. Individual toxicity values may be estimated for the missing endpoint using a default acute-chronic ratio (ACR) of ten (10), when data exist for acute WET, but not for chronic WET.

Q_e = The effluent flow rate as determined under section 11.4(a)(9) of this rule.

Q_w = The portion of the receiving waterbody allocated for mixing as determined under section 11.4(b) of this rule.

F = Fraction of the measured toxicity values greater than the preliminary wasteload allocation for acute or chronic WET determined under section 11.4(c) of this rule (fraction failed).

(2) When WET data are not available, the commissioner shall exercise best professional judgment, taking into account the source

and nature of the discharge, existing controls on point and nonpoint ~~source~~ **sources** of pollution, and, where appropriate, the dilution of the effluent in the receiving water to determine whether it is necessary to impose WET requirements in accordance with the following:

(A) For a new Great Lakes discharger, the commissioner shall determine whether it is necessary to impose WET limitations.

(B) For an existing Great Lakes discharger, whether it is necessary to require the applicant to collect the data required to make a determination under this subsection. The commissioner may include in the NPDES permit the following conditions to generate additional data and control toxicity if found:

(i) WET testing requirements to generate the data needed to adequately characterize the toxicity of the effluent to aquatic life.

(ii) A toxicity reduction evaluation and a schedule to comply with WET limits if any toxicity testing data indicate that the WET of an effluent is or may be discharged at levels that will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable WET criterion.

(iii) WET limits that become effective upon completion of the compliance schedule.

(3) Limitations on whole effluent toxicity are not necessary where the commissioner demonstrates in the fact sheet or briefing memo of the NPDES permit that chemical-specific limits for the effluent are sufficient to attain and maintain the applicable narrative water quality criteria for WET.

(d) Once the commissioner has determined in accordance with this section that a WQBEL must be included in an NPDES permit, the commissioner shall do the following:

(1) Rely upon the WLA established for the point source either as part of any EPA approved TMDL prepared under section 11.4 of this rule, or as part of an assessment and remediation plan developed and approved in accordance with section ~~11.4(a)(3)~~ **11.4(a)(2)** of this rule, or, in the absence of such TMDL or plan, calculate WLAs for the protection of acute and chronic aquatic life, wildlife, and human health in accordance with the provisions for developing wasteload allocations under section 11.4 of this rule.

(2) Develop water quality-based effluent limitations using these WLAs in accordance with section 11.6 of this rule.

(e) The commissioner may require monitoring for a pollutant or pollutant parameter even if it is determined that a WQBEL in the NPDES permit for that pollutant or pollutant parameter is not required.

(f) In addition to this section, effluent limitations shall be established to comply with all other applicable state and federal laws and regulations, including technology-based requirements and antidegradation policies.

(g) Notwithstanding subsection (b) or (c) **and only in situations where the intake and outfall points are located on the same body of water as defined in subsection (b)(4)(B),** the commissioner shall not impose WQBELs for a discharge consisting solely of once-through noncontact cooling water, except in accordance with the following:

(1) The commissioner may require a WQBEL based on an acute aquatic criterion **or value** for a substance or acute WET when information is available indicating that such a limit is necessary to protect aquatic life unless the discharger is able to demonstrate that the presence of the substance or WET is due solely to its presence in the intake water.

(2) The commissioner shall establish limitations or other requirements in the permit for the noncontact cooling water wastestream to prevent impairment of the receiving waterbody if a valid biological assessment of the receiving waterbody indicates that the noncontact cooling water discharge impairs an existing or designated use of the waterbody, exclusive of thermal impacts from a discharge for which alternative thermal effluent limitations have been established in accordance with Section 316(a) of the CWA and 327 IAC 5-7.

(3) If a substance is present at elevated levels in the noncontact cooling water wastestream due to improper operation or maintenance of the cooling system, and this substance is or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above a numeric criterion **or value** for a toxic substance as determined under subsection (b), WQBELs shall be established using the procedures in sections 11.4 and 11.6 of this rule.

(4) If the permittee uses or proposes to use additives in the noncontact cooling water wastestream, the additives shall be evaluated using the reasonable potential procedures contained under this section to determine whether ~~WQBELS~~ **WQBELs** are necessary for the wastestream.

(5) If the source of the noncontact cooling water wastestream is contaminated ground water, the provisions of this subsection do

not apply to the discharge of the substances contaminating the ground water.

(6) If one (1) or more wastestreams consisting solely of noncontact cooling water are combined with one (1) or more wastestreams not consisting solely of noncontact cooling water, the provisions of this subsection may still be applied to the wastestreams consisting solely of noncontact cooling water if, for the wastestreams that do not consist solely of noncontact cooling water, the following requirements are imposed:

(A) For each of the wastestreams composed entirely of storm water, permit conditions that the commissioner determines to be necessary to protect the water quality of the receiving waterbody shall be imposed. The requirements imposed shall be as if the storm water wastestream discharged directly into the receiving waterbody and shall be consistent with requirements imposed on other similar storm water discharges to the waterbody.

(B) For each of the wastestreams not composed entirely of storm water, each wastestream shall be evaluated to determine if there is a reasonable potential for the discharge of a pollutant or pollutant parameter to cause or contribute to an excursion above a narrative **criterion** or numeric water quality criterion **or value** as determined using the procedures in this section. For purposes of determining reasonable potential and developing WQBELs for these wastestreams, the preliminary wasteload allocations and wasteload allocations in the absence of a TMDL shall be determined as if these wastestreams discharged directly into the receiving waterbody without combining with the wastestreams consisting solely of noncontact cooling water.

(7) As used in this subsection, "once-through noncontact cooling water" means water used for cooling that does not come into direct contact with any raw material, intermediate product, final product, or waste product and makes one (1) or two (2) passes for the purpose of removing waste heat.

(h) The ~~following table establishes the~~ multiplying factors to be used in subsection (b) **are established in Tables 11.5-1 and 11.5-2 and shall be obtained as follows:**

(1) Round the coefficient of variation (CV) identified in subsection (b) to the nearest CV in Table 11.5-1 or Table 11.5-2. If the CV identified in subsection (b) is greater than 2.0, set the CV equal to 2.0.

(2) Obtain the appropriate multiplying factor from Table 11.5-1 or Table 11.5-2 using the number of samples identified in subsection (b) and the CV determined under subdivision (1). If the number of samples identified under subsection (b) is greater than one hundred (100), obtain the multiplying factor using one hundred (100) samples.

Table 11.5-1
Reasonable Potential Multiplying Factors

Number of Samples	Coefficient of Variation																				
	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
1	1.2	1.4	1.9	2.6	3.6	4.7	6.2	8.0	10.1	12.6	15.5	18.7	22.3	26.4	30.8	35.6	40.7	46.2	52.1	58.4	64.9
2	1.1	1.3	1.6	2.0	2.5	3.1	3.8	4.6	5.4	6.4	7.4	8.5	9.7	10.9	12.2	13.6	15.0	16.4	17.9	19.5	21.1
3	1.1	1.2	1.5	1.8	2.1	2.5	3.0	3.5	4.0	4.6	5.2	5.8	6.5	7.2	7.9	8.6	9.3	10.0	10.8	11.5	12.3
4	1.1	1.2	1.4	1.7	1.9	2.2	2.6	2.9	3.3	3.7	4.2	4.6	5.0	5.5	6.0	6.4	6.9	7.4	7.8	8.3	8.8
5	1.1	1.2	1.4	1.6	1.8	2.1	2.3	2.6	2.9	3.2	3.6	3.9	4.2	4.5	4.9	5.2	5.6	5.9	6.2	6.6	6.9
6	1.1	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.7	3.9	4.2	4.5	4.7	5.0	5.2	5.5	5.7
7	1.1	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9
8	1.1	1.1	1.3	1.4	1.6	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2	3.3	3.5	3.7	3.9	4.0	4.2	4.3
9	1.1	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9
10	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.9	2.0	2.2	2.3	2.4	2.6	2.7	2.8	3.0	3.1	3.2	3.3	3.4	3.6
11	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.5	2.7	2.8	2.9	3.0	3.1	3.2	3.3
12	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.0

13	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.9
14	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.7
15	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.5
16	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4
17	1.0	1.1	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.1	2.2	2.2	2.3	2.3
18	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2
19	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.1
20	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.0
21	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.5**	**1.5**	**1.6**	**1.6**	**1.7**	**1.7**	**1.7**	**1.8**	**1.8**	**1.9**	**1.9**	**1.9**	**2.0**
22	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.4**	**1.5**	**1.5**	**1.6**	**1.6**	**1.7**	**1.7**	**1.7**	**1.8**	**1.8**	**1.8**	**1.9**	**1.9**
23	**1.0**	**1.0**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.7**	**1.7**	**1.8**	**1.8**	**1.8**	**1.8**
24	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.7**	**1.7**	**1.7**	**1.8**	**1.8**
25	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.7**	**1.7**	**1.7**	**1.7**
26	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.6**	**1.7**	**1.7**
27	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
28	**1.0**	**1.0**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**
29	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.6**
30	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
31	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.5**
32	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**
33	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**
34	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**
35	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**
36	**1.0**	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**
37	**1.0**	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
38	**1.0**	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
39	**1.0**	**1.0**	**1.0**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
40	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3
~~50~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~	~~1.1~~
~~60~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~
~~70~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~
~~80~~	~~1.0~~	~~1.0~~	~~1.0~~	~~1.0~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~90~~	~~1.0~~	~~1.0~~	~~1.0~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~
~~100~~	~~1.0~~	~~1.0~~	~~1.0~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.9~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.8~~	~~0.7~~	~~0.7~~	~~0.7~~

Table 11.5-2
Reasonable Potential Multiplying Factors

Number of Samples	Coefficient of Variation																				
	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
41	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
42	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
43	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
44	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2
45	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
46	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2
47	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
48	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
49	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
51	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
52	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
53	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
54 to 63	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
64	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
65	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
66	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
67	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
68	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
69	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
70 to 73	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
74 to 77	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
78	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8
79	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
80 to 81	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8
82 to 83	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
84	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
85	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
86 to 87	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
88 to 89	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
90 to 92	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
93 to 96	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
97	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7
98 to 99	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7
100	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7

(Water Pollution Control Board; 327 IAC 5-2-11.5; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1450; errata filed Aug 11, 1997, 4:15

p.m.: 20 IR 3379)

SECTION 27. 327 IAC 5-2-11.6 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-11.6 Great Lakes system dischargers establishment of water quality-based effluent limitations (WQBELs)

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4

Sec. 11.6. (a) The NPDES permit shall include conditions necessary to achieve water quality standards established under 327 IAC 2-1.5, including narrative water quality criteria. The numeric water quality criteria set forth in 327 IAC 2-1.5-8 and Tier I criteria and Tier II values established under 327 IAC 2-1.5-11 through 327 IAC 2-1.5-16 shall not be enforceable against any point source discharger until translated into effluent limitations that are incorporated in NPDES permits in accordance with this article.

(b) Total maximum daily loads (TMDLs) and wasteload allocations (WLAs) developed under section 11.4 of this rule shall provide the basis for numeric water quality-based effluent limitations (WQBELs) established in NPDES permits for point sources discharging to waters within the Great Lakes system. If a variance has been granted from a water quality criterion under 327 IAC 2-1.5-17 and 327 IAC 5-3-4.1, WQBELs for the pollutant that is the subject of the variance shall be calculated on the basis of the variance rather than the water quality criterion.

(c) The following procedure shall be used to calculate WQBELs using the WLAs, ~~including~~ **except** WLAs for whole effluent toxicity (WET), developed under section 11.4 of this rule:

(1) This subsection assumes that effluent data follow a log-normal distribution. If a discharger is able to demonstrate that the effluent data for a pollutant does not follow a log-normal distribution, and provides an alternate distribution that more accurately describes the data, this alternate distribution may be used in lieu of the procedures in this subsection.

~~(2) The following procedures shall be used to translate a WLA based on a dissolved criterion into a total recoverable WLA used in the determination of WQBELs:~~

~~(A) Unless site-specific translators are determined in accordance with clause (B), the following translators shall be used to translate a dissolved WLA based on an acute or chronic dissolved aquatic water quality criterion into a total recoverable WLA to be used in the determination of total recoverable WQBELs in an NPDES permit:~~

~~Table 11.6-1~~

~~Metals Translators~~

~~Dissolved to Total Recoverable[††]~~

~~Substances~~	~~Acute Translators~~	~~Chronic Translators~~
~~Arsenic (III)~~	~~1.000~~	~~1.000~~
~~Cadmium~~	~~0.944~~	~~0.909~~
~~Chromium (III)~~	~~0.316~~	~~0.860~~
~~Copper~~	~~0.960~~	~~0.960~~
~~Mercury~~	~~0.850~~	~~0.850~~
~~Nickel~~	~~0.998~~	~~0.997~~
~~Selenium~~	~~0.922~~	~~0.922~~
~~Zinc~~	~~0.978~~	~~0.986~~

~~[†] Divide a dissolved WLA derived from an acute aquatic water quality criterion by the acute translator and divide a dissolved WLA derived from a chronic aquatic water quality criterion by the chronic translator.~~

~~(B) A discharger or proposed discharger may request the use of an alternate translator by using site-specific data. The discharger must conduct a site-specific study to identify the ratio of the dissolved fraction to the total recoverable fraction for a metal in~~

~~the receiving waterbody outside the mixing zone. If the discharger provides an acceptable study, and other provisions of 327 IAC 2-1.5 and this article are satisfied (such as antibacksliding and antidegradation), the commissioner shall use the site-specific translators to convert a dissolved WLA into a total recoverable WLA. A translator derived for one (1) discharge into a waterbody segment may be applied to other discharges on the same waterbody segment if the translator would adequately represent the site-specific conditions applicable to the other discharges.~~

~~(3)~~ **(2)** For the equations contained within this subsection the following apply:

(A) Z_{99} = 2.326 (99th percentile probability basis).

(B) CV = coefficient of variation = ratio of the standard deviation to the mean. A value of six-tenths (0.6) will be used for the CV unless the discharger demonstrates that an alternate CV is more representative of the variability of the pollutant in the effluent.

~~(4)~~ **(3)** The first step in this procedure is to calculate a long term average (LTA) for each WLA determined **for the pollutant** under section 11.4 of this rule. These LTAs are calculated as follows:

(A) The LTA_A protective of acute aquatic life effects shall be calculated as follows:

$$LTA_A = \left(e^{(0.5\sigma^2 - z_{99}\sigma)}\right) WLA_A$$

Where: σ^2 = $\ln(CV^2 + 1)$.

WLA_A = WLA determined under section 11.4 of this rule using **the** acute aquatic ~~criteria~~ **criterion** or ~~values or acute toxic units and, if appropriate, translated from a dissolved WLA to a total recoverable WLA in accordance with subdivision (2).~~ **value.** This WLA is expressed as a one (1) day maximum.

(B) The LTA_C protective of chronic aquatic life effects shall be calculated as follows:

$$LTA_C = \left(e^{(0.5\sigma_4^2 - z_{99}\sigma_4)}\right) WLA_C$$

Where: σ_4^2 = $\ln(CV^2/4 + 1)$.

WLA_C = **For sulfates, total dissolved solids, fluorides, and dissolved iron, the more stringent** WLA determined under section 11.4 of this rule using ~~criteria~~ **the criterion** for ~~sulfates, total dissolved solids, fluorides, and dissolved iron~~ **the pollutant** under 327 IAC 2-1.5-8(j), **if applicable, or the** chronic aquatic ~~criteria~~ **criterion** or ~~values or chronic toxic units and, if appropriate, translated from a dissolved WLA to a total recoverable WLA in accordance with subdivision (2).~~ **value. For other pollutants, the WLA determined under section 11.4 of this rule using the chronic aquatic criterion or value.** This WLA is expressed as a four (4) day average.

(C) The LTA_H protective of human health ~~life~~ effects shall be calculated as follows:

$$LTA_H = \left(e^{(0.5\sigma_{30}^2 - z_{99}\sigma_{30})}\right) WLA_H$$

Where: σ_{30}^2 = $\ln(CV^2/30 + 1)$.

WLA_H = **The most stringent** WLA determined under section 11.4 of this rule using ~~criteria~~ **a criterion** or ~~values~~ **value** for the protection of human health. This WLA is expressed as a thirty (30) day average.

(D) The LTA_W protective of wildlife effects shall be calculated as follows:

$$LTA_W = \left(e^{(0.5\sigma_{30}^2 - z_{99}\sigma_{30})} \right) WLA_W$$

Where:

σ_{30}^2 = $\ln(CV^2/30 + 1)$.

WLA_W = WLA determined under section 11.4 of this rule using **the** wildlife ~~criteria~~ **criterion** or ~~values.~~ **value.** This WLA is expressed as a thirty (30) day average.

~~(5)~~ **(4)** Daily maximum and monthly average WQBELs are determined using the lowest LTA calculated in subdivision ~~(4)~~ **(3)** as follows:

(A) The daily maximum WQBEL is calculated as follows:

$$\text{Daily Maximum} = \left(e^{(Z_{99}\sigma - 0.5\sigma^2)} \right) LTA$$

Where:

σ^2 = $\ln(CV^2 + 1)$.

(B) The monthly average WQBEL is calculated as follows:

$$\text{Monthly Average} = \left(e^{(Z_{95}\sigma_n - 0.5\sigma_n^2)} \right) LTA$$

Where:

σ_n^2 = $\ln(CV^2/n + 1)$.

z_{95} = 1.645 (95th percentile probability basis).

n = Number of samples per month. A value of ten (10) will be used unless the discharger demonstrates that an alternate value is more appropriate.

(C) ~~The values of 1.0 TU_a and 1.0 TU_c will be the most restrictive WQBELs established in an NPDES permit for WET.~~ **The monthly average WQBEL shall not exceed the most stringent WLA developed under section 11.4 of this rule unless calculated using the following:**

(i) A CV calculated using facility-specific effluent monitoring data that is representative of the variability of the pollutant in the effluent.

(ii) A value for n based on the monitoring frequency in the NPDES permit to be issued.

(d) Notwithstanding the provisions of subsection (c), **WQBELs for WET and** WQBELs for the criteria listed in section 11.4(d) of this rule shall be developed ~~to be consistent with the models used in that subsection.~~ **as follows:**

(1) For WET, WQBELs shall be developed using the WLAs for acute and chronic WET developed under section 11.4 of this rule as follows:

(A) The commissioner shall ensure that the WQBELs for WET established under this subdivision attain the acute and chronic WET criteria in 327 IAC 2-1.5-8 under the receiving waterbody flows and outside the mixing zones used to develop the WLAs for acute and chronic WET under section 11.4 of this rule.

(B) The commissioner shall determine, on a case-by-case basis, the following:

(i) Whether to develop a WQBEL for only acute or chronic WET or WQBELs for both acute and chronic WET.

(ii) The number of species required for WET testing.

(iii) The particular species required for WET testing.

(C) In making the determination in clause (B), the commissioner shall take into consideration available information about the discharge and receiving waterbody, including, but not limited to, the following:

(i) The acute-chronic ratio of the effluent.

(ii) The sensitivity of the test species to the toxicity in the effluent.

(iii) The WLAs developed for acute and chronic WET under section 11.4 of this rule.

(D) When the commissioner determines that it is necessary to develop a WQBEL for acute WET, the WQBEL shall be set equal to the WLA developed for acute WET under section 11.4 of this rule and shall be established in an NPDES permit as a daily maximum limit.

(E) When the commissioner determines that it is necessary to develop a WQBEL for chronic WET, the WQBEL shall be set equal to the WLA developed for chronic WET under section 11.4 of this rule and shall be established in an NPDES permit as a monthly average limit.

(2) For the criteria listed in section 11.4(d) of this rule, WQBELs shall be developed to be consistent with the models used in that subsection.

(e) WQBELs in an NPDES permit for ~~metals~~ **a metal** calculated from a ~~dissolved~~ water quality criterion **expressed in the form of dissolved metal that is:**

(1) contained in 327 IAC 2-1.5; **or**

(2) subsequently developed under the procedures contained in 327 IAC 2-1.5;

shall be expressed in the permit as ~~the~~ total recoverable ~~metals fraction~~ **metal** unless all approved analytical methods for the metal inherently measure only its dissolved form, such as hexavalent chromium.

(f) Water quality-based effluent limitations for cyanide, calculated from a criterion for free cyanide contained in 327 IAC 2-1.5, shall be limited in the permit as free cyanide and monitored in the effluent using the "Cyanides Amenable to Chlorination" (CATC) method ~~(Standard Methods for the Examination of Water and Wastewater,~~ **(40 CFR 136,** Method 4500-CN G) **or another method approved by** the commissioner. ~~may approve the use of the "Weak and Dissociable Cyanide" method (Standard Methods for the Examination of Water and Wastewater, Method 4500-CN I) if the applicant demonstrates that interferences render the CATC method inaccurate.~~ The commissioner may include additional monitoring, limitations, or other requirements in a permit, on a case-by-case basis, if the additional requirements are necessary to ensure that water quality standards will be attained.

(g) Whenever a WQBEL is developed, unless otherwise provided in subdivision (3), ~~or (4),~~ the WQBEL in the NPDES permit shall be expressed as both a concentration value and a corresponding mass loading rate as follows:

(1) Both mass and concentration limits shall be based on the same permit averaging periods, such as daily, or monthly averages, or in other appropriate permit averaging periods.

(2) The mass loading rates shall be calculated using effluent flow rates that are the same as those used in establishing the concentration-based WQBELs.

(3) For pollutants or parameters that cannot appropriately be expressed in terms of mass (such as pH, temperature, radiation, bacteria, or dissolved oxygen) mass limits are not required.

(4) A discharger may request tiered mass limits for a discharge that increases as a result of wet weather flow. As used in this subdivision, "tiered mass limits" consists of two (2) sets of mass limits. One (1) set shall be based on the dry-weather effluent flow determined under section 11.4(a)(9) of this rule and the stream design flow under section 11.4(b) of this rule. The second set shall be based on an effluent flow and stream flow under wet weather conditions. **For each mass limit developed under this subdivision, the NPDES permit shall include a corresponding concentration limit.**

(h) When a WQBEL for a pollutant is calculated to be less than the ~~level~~ **limit** of quantitation (LOQ), the following conditions apply:

(1) The calculated WQBEL shall be established as the limit in the NPDES permit.

(2) The analytical method, ~~level~~ **limit** of detection (LOD), and LOQ shall be specified as follows:

(A) The commissioner shall specify in the permit the most sensitive, applicable, analytical method, specified in or approved under 40 CFR 136 or by the commissioner, to be used to monitor for the presence and amount in an effluent of the pollutant for which the WQBEL is established and shall specify in accordance with clause (B), the LOD and LOQ that can be achieved by use of the specified analytical method.

(B) The LOD and LOQ shall be determined as follows:

(i) The method detection level (MDL) shall be used as the LOD unless the permittee demonstrates that a higher LOD is appropriate because of effluent-specific matrix interference.

(ii) The LOQ shall be the minimum level (ML) specified in or approved under 40 CFR 136 for the method for that pollutant.

If no such ML exists, or if the method is not specified or approved under 40 CFR 136 or by the commissioner, the LOQ shall be calculated by multiplying the LOD by three and eighteen-hundredths (3.18). The commissioner may specify a higher LOQ if the permittee demonstrates that a higher LOQ is appropriate because of effluent-specific matrix interference. Other methods for deriving an LOQ may be approved by the commissioner if the method is scientifically defensible.

(3) Compliance with the WQBELs for the pollutant shall be determined as follows:

(A) When a daily maximum WQBEL is less than the LOD specified in the permit, **effluent levels:**

(i) ~~effluent levels~~ of the pollutant less than the LOD are in compliance with the maximum WQBEL; and

(ii) ~~effluent levels~~ greater than the LOD but less than the LOQ are in compliance with the maximum WQBEL, except when confirmed by a sufficient number of analyses of multiple samples and use of appropriate statistical techniques.

(B) When a daily maximum WQBEL is greater than the LOD specified in the permit but less than the LOQ specified in the permit, effluent levels of the pollutant less than the LOQ are in compliance with the WQBEL.

(C) To determine compliance with a WQBEL expressed as a daily maximum mass limitation, the LOD and LOQ shall each be converted to a mass value, using appropriate conversion factors and the same effluent flow used to determine the mass-based WQBEL, before applying the provision of clauses (A) and (B).

(D) When a monthly or weekly average WQBEL is less than the LOQ specified in the permit, a monthly or weekly average effluent level less than or equal to the respective monthly or weekly average WQBEL is in compliance with the monthly or weekly average WQBEL. Daily effluent values that are less than the LOQ, used to determine the monthly or weekly average effluent levels less than the LOQ, may be assigned a value of zero (0), unless, after considering the number of monitoring results that are greater than the LOD, and applying appropriate statistical techniques, a value other than zero (0) is warranted.

(4) When a WQBEL is less than the LOD, the commissioner may require a period of accelerated monitoring in a permit, when the measured effluent level is between the LOD and LOQ, for the purpose of collecting additional data to apply the statistical analysis referenced in subdivision ~~(3)(B)~~ **(3)(A)** and (3)(D).

(5) When a WQBEL is less than the LOQ, special conditions may be included in the permit to better quantify the levels of pollutant present in the discharge. These special conditions may include, but are not limited to, the following:

(A) Fish tissue sampling.

(B) Caged-biota studies.

(C) Whole effluent toxicity (WET) tests.

(D) Limits on internal wastestreams.

(E) Monitoring requirements on internal wastestreams.

(F) Development of a more sensitive analytical procedure.

(G) Monitoring for surrogate parameters.

(H) Waterbody bioassessment.

(6) The permit shall contain reopener clauses authorizing modification or revocation and reissuance of the permit to:

(A) include more stringent monitoring requirements or conditions if new information generated as a result of accelerated monitoring conducted in accordance with subdivision (4), or special conditions included in the permit in accordance with subdivision (5) indicates the likely presence of the pollutant in the discharge at levels above the WQBEL; and

(B) specify the use of a different analytical method if a more sensitive analytical method has been specified in or approved under 40 CFR 136 or approved by the commissioner to monitor for the presence and amount in the effluent of the pollutant for which the WQBEL is established and shall specify in accordance with subdivision (2)(B), the LOD and LOQ that can be achieved by use of the specified analytical method.

(7) The commissioner shall include a condition in the permit requiring the permittee to develop and conduct a pollutant minimization program (PMP) for each pollutant with a WQBEL below the LOQ in accordance with the following:

(A) The goal of the pollutant minimization program shall be to maintain the effluent at or below the WQBEL. The pollutant minimization program shall include, but is not limited to, the following:

(i) Submission of a control strategy designed to proceed toward the goal.

(ii) Implementation of appropriate cost-effective control measures consistent with the control strategy.

(iii) Monitoring necessary to monitor the progress toward the goal. **This shall include, but is not limited to, the following:**

(AA) Semiannual monitoring of potential sources of the pollutant.

(BB) Quarterly monitoring for the pollutant in the influent of the wastewater treatment system.

(iv) An annual status report that shall be sent to the commissioner, including the following:

(AA) All minimization program monitoring results for the previous year.

(BB) A list of potential sources of the pollutant.

(CC) A summary of all actions taken to reduce or eliminate the identified sources of the pollutant.

(v) A ~~pollution~~ **pollutant** minimization program may include the submittal of pollution prevention strategies that use changes in production process technology, materials, processes, operations, or procedures to reduce or eliminate the source of the pollutant.

(B) No ~~pollution~~ **pollutant** minimization program is required if the permittee demonstrates that the discharge of a pollutant with a WQBEL below the LOQ is reasonably expected to be in compliance with the WQBEL at the point of discharge into the receiving water. This demonstration may include, but is not limited to, the following:

(i) Treatment information, including information derived from modeling the destruction or removal of the pollutant in the treatment process.

(ii) Mass balance information.

(iii) Fish tissue studies or other biological studies.

(C) In determining appropriate cost-effective control measures to be implemented in a ~~pollution~~ **pollutant** minimization program, the following factors may be considered:

(i) Significance of sources.

(ii) Economic and technical feasibility.

(iii) Treatability.

(D) The permit shall contain a reopener clause authorizing modification or revocation and reissuance of the permit to revise (such as more or less frequent monitoring) or remove the requirements of this subdivision if supported by information generated as a result of this subdivision.

(i) The determinations under this subsection regarding the consideration of intake pollutants, as defined under section 11.5(b)(4)(A) of this rule, shall be made on a pollutant-by-pollutant, outfall-by-outfall basis. This subsection applies only when the concentration of the pollutant of concern upstream of the discharge, as determined under section 11.4(a)(8) of this rule, exceeds the most stringent applicable water quality criterion **or value** for that pollutant. In addition, this subsection applies only in the absence of an EPA-approved TMDL applicable to the discharge, or in the absence of an assessment and remediation plan submitted and approved in accordance with section 11.4(a)(2) of this rule. ~~The requirements of section 11.5(b)(3)(A) of this rule shall also apply to this section.~~ The following procedures shall be used in the consideration of intake pollutants in establishing WQBELs:

(1) When an intake pollutant is from the same body of water, as defined under section 11.5(b)(4)(B) of this rule, and the discharge and the facility meet the conditions in section 11.5(b)(4)(C)(i)(BB) through 11.5(b)(4)(C)(i)(EE), the following procedures apply:

(A) The commissioner may establish effluent limitations allowing the facility to discharge a mass and concentration of the pollutant that are no greater than the mass and concentration of the pollutant identified in the facility's intake water (no net addition limitations). The permit shall specify how compliance with mass and concentration limitations shall be assessed. No permit may authorize no net addition limitations that are effective after March 23, 2007. After that date, WQBELs shall be established in accordance with section 11.5(d) of this rule.

(B) Where proper operation and maintenance of a facility's treatment system results in removal of a pollutant, the commissioner may establish limitations that reflect the lower mass or concentration, or both, of the pollutant achieved by such treatment, taking into account the feasibility of establishing such limits.

(C) For pollutants contained in intake water provided by a water system, the concentration of the intake pollutant shall be determined at the point where the raw water supply is removed from the same body of water, except that it shall be the point where the water enters the water supplier's distribution system where the water treatment system removes any of the identified pollutants from the raw water supply. Mass shall be determined by multiplying the concentration of the pollutant by the volume of the facility's intake flow received from the water system.

(2) Where the pollutant in a facility's discharge originates from a water of the state that is not the same body of water as the receiving water, as determined in accordance with section 11.5(b)(4)(B) of this rule, WQBELs shall be established based upon the most stringent applicable water quality criterion **or value** for that pollutant.

(3) Where a facility discharges intake pollutants that originate in part from the same body of water, and in part from a different body of water, the commissioner may apply the procedures of subdivisions (1) and (2) to derive an effluent limitation reflecting

the flow-weighted average of each source of the pollutant, provided that adequate monitoring to determine compliance can be established and is included in the permit.

(Water Pollution Control Board; 327 IAC 5-2-11.6; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1457; errata filed Aug 11, 1997, 4:15 p.m.: 20 IR 3379; errata, 26 IR 3884)

SECTION 28. 327 IAC 5-2-13 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-13 Monitoring

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-18-4

Sec. 13. (a) To assure compliance with permit terms and conditions, all permittees shall monitor, as required in the permit, the following:

(1) The mass, concentration, or other measurement specified in sections 11, 11.1, and 11.6 of this rule for each pollutant specified in the permit.

(2) The volume of wastewater flow at monitoring points specified in the permit, including the final effluent flow from each point source.

(3) Other parameters and conditions as specifically required in the permit.

(b) A POTW shall monitor the mass, concentration, or other units of specified pollutants in the raw influent, in the discharge from intermediate unit treatment processes as specified in the permit or the applicable report of operation form, and in the final effluent, and the volume of effluent flow. For purposes of this section and sections 14 through 15 of this rule, a POTW includes a municipality or other political subdivision, such as a regional sewer district, ~~which~~ **that** owns or operates a wastewater treatment ~~works~~ **plant** or a **water** treatment plant, ~~for public water supply~~ **as defined in IC 13-11-2,** or a private utility of a quasi-public nature ~~which~~ **that** owns or operates a treatment plant for a mobile home park, a residential development, etc., from which a permitted discharge occurs.

(c) For purposes of subsections (a) and (b), the commissioner shall specify the following monitoring requirements in the permit:

(1) Requirements concerning proper installation, use, and maintenance of monitoring equipment or methods (including biological monitoring methods where appropriate).

(2) Monitoring frequency, type, and intervals sufficient to yield continuing data representative of the volume of effluent flow and the quantity of pollutants discharged based on the impact of the waste stream on the receiving water, in accordance with 40 CFR 122.44.

(3) Test procedures for the analysis of pollutants meeting the requirements of subsection (d).

(d) Requirements for test procedures shall be as follows:

(1) Test procedures identified in 40 CFR 136 shall be utilized for pollutants or parameters listed in that part, unless an alternative test procedure has been approved under 40 CFR 136.5.

(2) Where no test procedure under 40 CFR 136 has been approved, analytical work shall be conducted in accordance with ~~the most recent edition of "Standard Methods for the Examination of Water and Wastewater", published by the American Public Health Association (APHA) or as otherwise specified~~ **test procedures approved** by the commissioner. ~~in the permit.~~

(3) Notwithstanding subdivision (1), the commissioner may specify in a permit the test procedure ~~used in developing the data on which an effluent limitations guideline was based, or~~ specified ~~by the standards and guidelines.~~ **in a standard or effluent limitations guideline.**

(e) The sampling frequency and other monitoring requirements specified by the commissioner under subsection (c) shall, to the extent applicable, be consistent with monitoring requirements specified in a standard or effluent limitations guideline on which the effluent limitations in the permit are based. In no case shall the sampling frequency be less than once per calendar year.

(f) Where composite samples are specified in the permit, each fraction of the composite shall be weighted in proportion to the flow corresponding to the time that sample fraction is taken unless the permittee demonstrates that such flow-weighting of sample fractions is not necessary to obtain representative monitoring results. *(Water Pollution Control Board; 327 IAC 5-2-13; filed Sep 24, 1987, 3:00 p.m.: 11 IR 628; filed Feb 26, 1993, 5:00 p.m.: 16 IR 1753; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1465)*

SECTION 29. 327 IAC 5-2-15 IS AMENDED TO READ AS FOLLOWS:

327 IAC 5-2-15 Reporting requirements

Authority: IC 13-14-8; IC 13-14-9; IC 13-15-1-2; IC 13-15-2-1; IC 13-18-3

Affected: IC 13-11-2; IC 13-14-4-3; IC 13-18-4

Sec. 15. (a) Permittees shall report to the commissioner, using discharge monitoring reports (DMR) (EPA Form 3320-1) and, also, in the case of POTWs, semipublic, state, and federal facilities' reports of operation, the results of any monitoring specified by the permit, ~~pursuant to~~ **under** section 13 of this rule, as often as required by the permit, but in no case less than once per year. POTWs with pretreatment or hybrid pretreatment requirements in their NPDES permits as well as industrial dischargers shall also submit the results of effluent analysis on the Indiana Discharge Monitoring Report Form 30530.

(b) If the permittee monitors any pollutant more frequently than required by the permit, using approved analytical methods, the results of this monitoring shall be reported in the DMR. Other monitoring data not specifically required in the permit (such as internal process or internal waste stream data) ~~which~~ **that** is collected by or for the permittee need not be submitted unless requested by the commissioner. Any such additional monitoring data ~~which~~ **that** indicates a violation of a permit limitation shall be followed up by the permittee, whenever feasible, with a monitoring sample obtained and analyzed pursuant to approved analytical methods. The results of the analysis of the follow-up sample shall be reported to the commissioner in the permittee's DMR.

(c) All reports required by this section shall be prepared by or under the direction of a certified wastewater treatment plant operator or a certified water treatment plant operator licensed under the provisions of 327 IAC 8 when such reports concern a discharge originating in whole or in part from a wastewater treatment plant or a water treatment plant, respectively, as defined in IC 13-11-2.

(d) As used in this section, "approved analytical methods" means those test procedures for the analysis of pollutants ~~which conform to 40 CFR 136 or are specified in the permit.~~ **under section 13(d) of this rule.**

(e) NPDES effluent data is to be reported on the monthly DMRs as follows:

(1) Effluent concentrations less than the limit of detection (LOD) shall be reported as less than the value of the LOD. For example, if a substance is not detected at a concentration of one (1.0) milligram per liter, the value shall be reported as < 1.0 mg/l.

(2) Effluent concentrations greater than or equal to the LOD shall be reported at the measured value. Effluent concentrations greater than or equal to the LOD and less than the limit of quantitation (LOQ) that are reported on a DMR shall be annotated on the DMR to indicate that the value is not quantifiable.

(3) Except as provided in section 11.6(h)(3) of this rule, when the individual daily values are averaged for the purpose of determining the weekly average or monthly average, values less than the LOQ shall be accommodated in calculation of the averages using statistical methods that have been approved by the commissioner.

(4) Mass discharge values ~~which~~ **that** are calculated from concentrations reported as less than the value of the limit of detection shall be reported as less than the corresponding mass discharge value.

(5) Mass discharge values that are calculated from effluent concentrations greater than the limit of detection shall be reported at the calculated value.

(6) Except as provided in section 11.6(h)(3) of this rule, when the individual daily mass discharge values are averaged for the purpose of determining the weekly average or monthly average, values less than the LOQ shall be accommodated in calculation of the averages using statistical methods that have been approved by the commissioner.

(Water Pollution Control Board; 327 IAC 5-2-15; filed Sep 24, 1987, 3:00 p.m.: 11 IR 629; filed Feb 26, 1993, 5:00 p.m.: 16 IR 1754; filed Jan 14, 1997, 12:00 p.m.: 20 IR 1466)

Notice of Public Hearing

Under IC 4-22-2-24, IC 13-14-8-6, and IC 13-14-9, notice is hereby given that on June 9, 2004, at 1:30 p.m., at the Indiana Government Center-South, 402 West Washington Street, Conference Center Room A, Indianapolis, Indiana the Water Pollution Control Board (board) will hold a public hearing on amendments to rules concerning water quality.

The purpose of this hearing is to receive comments from the public prior to preliminary adoption of this rule by the board. All interested persons are invited and will be given reasonable opportunity to express their views concerning the drafted new rule. Oral statements will be heard, but, for the accuracy of the record, all comments should be submitted in writing.

Additional information regarding this action may be obtained from MaryAnn Stevens, Rules Section, Office of Water Quality, (317) 232-8635 or (800) 451-6027 (in Indiana).

Individuals requiring reasonable accommodations for participation in this event should contact the Indiana Department of Environmental Management, Americans with Disabilities Act coordinator at:

Attn: ADA Coordinator

Indiana Department of Environmental Management

100 North Senate Avenue

P.O. Box 6015

Indianapolis, Indiana 46206-6015

or call (317) 233-1785 (V) or (317) 232-7589 (TDD). Please provide a minimum of 72 hours' notification.

Copies of these rules are now on file at the Office of Water Quality, Indiana Department of Environmental Management, Indiana Government Center-North, 100 North Senate Avenue, Room 1255 and Legislative Services Agency, One North Capitol, Suite 325, Indianapolis, Indiana and are open for public inspection.

Tim Method
Deputy Commissioner
Office of Water Quality
Indiana Department of Environmental Management