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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD AUG 15 2002

STATE OF ILLINOIS
Pollution Control Board

IN THE MATTER OF:)
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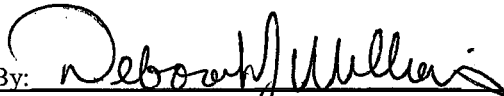
PROPOSED AMENDMENTS TO AMMONIA) R02-19
NITROGEN STANDARDS 35 Ill. Adm. Code)
302.212, 302.213, and 304.122) *P.C.#7*
)

NOTICE OF FILING

Please see attached Service List

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board the **COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**, a copy of which is herewith served upon you.

ENVIRONMENTAL PROTECTION AGENCY
OF THE STATE OF ILLINOIS

By: 
Deborah J. Williams
Assistant Counsel
Division of Legal Counsel

DATED: August 13, 2002

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:)
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PROPOSED AMENDMENTS TO) R 02-19
AMMONIA NITROGEN STANDARDS) (Rulemaking-Water)
35 ILL. ADM. CODE 302.212, 302.213,)
AND 304.122)

COMMENTS OF THE ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

NOW COMES the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY ("Illinois EPA"), by its attorney, Deborah J. Williams, and hereby submits comments in the above captioned rulemaking proceeding.

The Illinois EPA appreciates the Illinois Pollution Control Board's ("Board") efforts in this rulemaking to amend the ammonia nitrogen water quality standard and welcomes the opportunity to make these comments.

The Illinois EPA has reviewed the Board's First Notice Opinion and Order in this matter and the comments submitted by the proponent, Illinois Association of Wastewater Agencies ("IAWA"), and submits the following comments in response thereto.

Comments on First Notice Opinion and Order

The Board's First Notice Opinion, in large measure, resembles the amended rulemaking proposal submitted by IAWA on April 3, 2002 and supported by the Illinois EPA. IAWA's amended proposal incorporated the comments raised by the Illinois EPA in the pre-filed testimony of Bob Mosher and addressed several questions or concerns raised by the Board at the first substantive hearing held in this matter in Chicago, Illinois on March 25, 2002. These changes included: changing the term Summer and Winter

to Early Life Stages Present and Early Life Stages Absent, adding the term water before the word temperature in several places, adding a definition of the term early life stage and changing the method for evaluating attainment of the sub-chronic water quality standard to require that the four samples utilized must be taken on four consecutive days. In addition, in its post-hearing comments, IAWA supported one additional change – that the word “rather” be deleted from the definition of early life stage. Except for the language requiring the sub-chronic standard to be determined by averaging daily samples collected over four consecutive days, all of these suggestions were incorporated by the Board in its First Notice Opinion.

The Board’s Opinion also takes into account the typographical suggestions recommended by the Illinois EPA in its Post-Hearing Comments. These suggestions included: adding the term “water” before the word temperature in a few places missed in the amended proposal, creating typographical consistency in the equations, and correcting the rounding error for five values in the Appendix listing temperature and pH dependent values for the chronic standard.

In addition, the Board made some typographical and substantive changes to the proposed rule that were not suggested by the parties to this proceeding.

Comments on Typographical Changes in First Notice Opinion

The Illinois EPA would like to provide comments on a few of the minor changes made by the Board to the rulemaking as proposed by IAWA.

Throughout the rulemaking the Board changed the term “shall” to “must” in order to make the proposal more grammatically correct and or consistent. In most places, including the opening paragraph of 302.212(b) and subsections 302.212(b)(1) and (2),

this change has no substantive impact on the rule. In a few places, it appears this change has either altered the meaning or highlighted a problem with the proposed version. The Illinois EPA would like to point out the instances in which “is” or “are” should have been used initially instead of “shall.”

In 302.212(b)(3) instead of “The sub-chronic standard *must equal* 2.5 times the chronic standard,” the rule would be more correct if it read “The sub-chronic standard *is equal to* 2.5 times the chronic standard.” As this section is defining the sub-chronic standard, rather than the method for evaluating attainment of that standard, this change makes the provision more grammatically accurate. The same change could be made to subsections 302.212(c)(2) and (3) where the Board changed the term “shall” to “must”, but the shall should probably be replaced with “is” so the sentences would read “Attainment of the chronic [or sub-chronic] standard *is* evaluated pursuant to”

Similarly in Section 302.212(e), “The Early Life Stage Present period must occur from March through October” should be “The Early Life Stage Present period occurs from March through October.” The last sentence of that subsection should be changed from “All other periods must be subject to the Early Life Stage Absent period” should be “All other period are subject to the Early Life Stage Absent period.”

In subsections 302.212(c)(2) and (c)(3), the Board also changed the sentence structure from the proposal to make the rule more grammatically correct or consistent. However, this has resulted in an improper use of one of the terms discussed. “The total ammonia nitrogen” is more accurately referred to as “Total ammonia nitrogen.” The entire phrase “total ammonia nitrogen” is used as a noun that refers to the pollutant itself. The Board’s opinion instead uses “total” as a modifier of ammonia nitrogen.

In the process of changing the method for determining the chronic and sub-chronic standards in subsections 302.212(c)(2) and (3), the Board deletes the phrases "30 day average concentration of" and "4 day average concentration of" from these sections. This minor change in sentence structure creates some vagueness and confusion in the rule, as it can be read as changing the sub-chronic and chronic standards from a 30 day average or 4 day average into instantaneous or acute standards. This potentially changes the meaning of each of these sections in a manner that is inconsistent with United States Environmental Protection Agency's ("U.S. EPA") National Criteria Document ("NCD") for ammonia. If interpreted this way, these sections actually write the acute and sub-chronic standards out of the rule, as any individual sample that violates the chronic standard would necessarily violate the sub-chronic and acute. This makes the rulemaking much more stringent than the current standard and the NCD. This problem can be resolved by the amendments suggested by IAWA and discussed fully below.

Comments on Substantive Changes in First Notice Opinion

The Board concerns related to the consistency of the IAWA amended proposal with the NCD resulted in the key substantive changes between the proposal and the first notice. These changes related primarily to the averaging period of the chronic standard, the number of samples necessary to determine attainment with the standard, and the relationship between the chronic and sub-chronic standards.

At both the first and second hearings the Board raised concerns about whether the proposal adequately established a sub-chronic water quality standard that would address what the Board termed the "highest four day average within the thirty day

period” concept of the National Criteria Document. Transcript of Springfield hearing at 32. IAWA made changes to its initial proposal in an attempt to address this issue and the Illinois EPA stated in its post hearing comments that “the changes proposed by IAWA [are] the best way to ensure that the National Criteria Document’s intent to establish distinct four day and thirty day chronic toxicity standards is implemented. In addition, this language establishes water quality standards whose attainment can be assessed with the available or obtainable monitoring data.” Illinois EPA Post Hearing Comments at p. 5.

In its First Notice Opinion the Board more fully identified its concerns regarding the averaging period for determining attainment of the chronic standard:

The proposed formulae for determining the total ammonia nitrogen acute, chronic, and sub-chronic standards at Section 302.212(b) mirror the standards recommended in the 1999 NCD. However, the proposed attainment requirements at Section 302.212(c)(2) and (c)(3) deviate somewhat from the 1999 ammonia NCD. While the 1999 ammonia NCD recommends using a 30-day average ammonia concentration to show compliance with the ammonia CS, the IAWA’s proposal requires a minimum of four consecutive samples collected over a period of at least 30 days. In case [sic] of the sub-chronic standard, while the 1999 ammonia NCD recommends that the highest four-day average within the 30-day period be used for demonstrating attainment, proposed Section 302.212(c)(3) requires daily samples collected over a period of any four consecutive days to show compliance. Slip. op. at p. 4.

The Board further states:

While the Board recognizes the Agency’s desire to fashion an attainment averaging period to fit its routine ambient monitoring network sampling schedule, the Board continues to be concerned by the substantial increase in the averaging period allowed by the IAWA proposal. . . . Because of the Board’s concern, today the Board amends IAWA’s proposal at Section 302.212(c)(2) to limit the averaging period for showing attainment of the ammonia CS to 30 days. Slip. op. at 5.

The Illinois EPA believes that the Board's concerns over the consistency of the averaging period between the proposal and the NCD are legitimate. Although several existing Board regulations evaluate attainment of a four day average chronic standard using samples collected over a period of *at least* four days, the NCD does establish a chronic standard based on a 30 day average and the rule proposed by IAWA did not conform to this important provision. The Illinois EPA supports the Board in changing the averaging periods of the chronic standard to 30 days and the sub-chronic standard to four consecutive days and recognize this as being more consistent with the 1999 NCD. However, the Board further went on to allow the chronic standard to be evaluated using as little as one sample. This change is more inconsistent with the NCD than the original proposal. By not requiring attainment to be determined using at least four samples within a 30 averaging period, the Board has changed the chronic water quality standard from an average to an instantaneous standard. This change makes the acute and sub-chronic standards meaningless and creates a water quality standard that is much stricter than that provided in the 1999 NCD.

Illinois EPA agrees with the Board that the chronic standard is intended to measure a 30 day period of exposure and it is appropriate to specify the averaging of samples collected over a 30 day period. But the chronic and sub-chronic standards must be an average. One sample can never be sufficient to assess attainment of these standards. The Illinois EPA has reviewed the changes IAWA has suggested to address this issue and is in substantial agreement with the suggested amendments. IAWA's proposed changes will be discussed in more detail below. The Illinois EPA agrees that proposed rule differs from the NCD in the way it interpreted the chronic standard. The

initial proposal was a compromise to best meet the available sampling data so as to make use of the standard and conform to the concepts of the NCD. The Illinois EPA feels the Board's suggestion for dealing with this issue strays much too far from the NCD by writing the acute and sub-chronic standards out of the rule.

Although not discussed specifically in the Board's opinion, the Board deleted the sentence "The samples must be collected in a manner that assures an average representative sampling period" from Sections 302.212(c)(2) and (c)(3). It is not exactly clear why these sentences were deleted, but the Illinois EPA maintains that this phrase is a necessary component of this rulemaking to assure that no party will be able to use non-representative data to evaluate attainment with the water quality standard over the relevant averaging period. Just as allowing samples to be taken over a six month period does not accurately reflect the 30-day average ammonia concentration of a given waterbody, samples collected daily during a single week would not accurately reflect what the 30-day concentration of ammonia was for that waterbody. Samples must have some value in representing the average required in the regulations. IAWA's comments include a proposal which provides some guidance for a time period that serves as a useful guideline for a representative sampling time period that is discussed below. The Illinois EPA recommends the Board include this phrase in the final rule.

The Board also expressed concern that IAWA's proposal did not require that: "Compliance with the sub-chronic standard is achieved by averaging the four highest sample results collected over a four-day period within the 30 day averaging of the ammonia CS." Slip. op. at 5. The Illinois EPA disagrees with this characterization of the sub-chronic standard by the Board. As indicated in IAWA's comments, the sub-

chronic standard must be a stand alone requirement. Attainment of this standard is based on the chronic standard multiplied by 2.5 as calculated using the pH, temperature and total ammonia concentration from those four samples being used to show compliance with that standard. In order to assist in explaining the Illinois EPA's interpretation to the Board, examples have been provided as an exhibit as to how attainment with the three standards could be determined using various combinations of available samples. See Exhibit A.

In resolving the inconsistency perceived by the Board between Section 302.212(c)(3) of IAWA's proposal and the NCD, the Board deleted "using daily samples collected over a period of four consecutive days" and replaced it with "averaging the highest sample results collected over four consecutive days within the 30 day period specified in subsection 302.212(c)(2)." The Illinois EPA is not clear on how the Board intends this provision to be implemented. It is not at all clear how the highest sample results would be determined. Would these values be temperature and pH dependent? Would it be necessary to have 30 consecutive days of data to determine attainment of the sub-chronic standard? Do you average each four day combination separately to figure out the highest or do you take the highest total? This particular change seems to make the rule weaker than U.S. EPA's criteria document intends, even though the language was taken directly from that document. It could not have been U.S. EPA's intent that only one four day period per month would be capable of exceeding the sub-chronic standard. If the second or third highest four day periods also violate the sub-chronic standard for that period, it does not make sense that those periods would be found to attain the sub-chronic standard because only the worst four day period

represents an exceedance of the standard. The Illinois EPA urges the Board to reconsider the changes made to this portion of IAWA's proposal.

Comments on IAWA'S Suggested Changes to First Notice Opinion

The Illinois EPA has reviewed the comments and suggested changes presented by IAWA in response to the Board's First Notice Opinion and Order and would like to provide the following comments.

Number and Representativeness of Samples

IAWA proposes to accept the Board's change to the sampling period for the chronic standard to a strict 30 day averaging period. The Illinois EPA is also in agreement with this change as an accurate reflection of the recommendations in 1999 NCD. IAWA also proposes a change to the number of samples required for evaluating attainment of the chronic standard to the average of at least four samples in a 30 day period. In order to be representative of that 30 day period, IAWA suggests that the Board require a minimum of four samples collected at weekly intervals or at other frequency distributions representative of the sampling period. The Illinois EPA supports this language as a reasonable method of obtaining representative samples. Four weekly samples are likely to be a more accurate representation of a 30 day period than samples taken within only one or two weeks out of the period and the suggested language retains flexibility, if necessary, for a finding that samples taken at a somewhat different interval are also representative of the chronic averaging period. The Illinois EPA also believes that there may be other concerns that would address the issue of representativeness of the samples collected that have not been addressed by IAWA's proposed language including the time of day the samples were taken, the type of

samples taken, and the confidence level of the available data. As indicated previously, the Illinois EPA supports the language presented in IAWA's amended proposal and also presented in its first notice comments requiring attainment of the sub-chronic standard to be evaluated using four daily samples collected over a four day period. The sub-chronic standard is intended to apply to a four day exposure period. The Illinois EPA does not agree that the four day period must be connected to a specific 30 day chronic period. See Exhibit A for Illinois EPA's interpretation of how to evaluate attainment of the sub-chronic standard. In order to determine attainment of the sub-chronic standard for any four day period, the pH and temperature for each sample will be applied to the formulas given to determine the chronic standard for those samples and then multiplied by 2.5 to determine the sub-chronic standard for each sample. The four or more samples are then evaluated for attainment by using the formula provided in Section 302.212(d) to find the quotient.

Linkage Between the Chronic and Sub-Chronic Standards

In its First Notice Opinion the Board states: "although IAWA's proposal includes both the chronic and sub-chronic total ammonia standards recommended by the federal guidance, there is no linkage between the averaging period of the two standards." Slip. Op. at 4. IAWA has attempted to address the Board's concerns regarding this issue. The Illinois EPA strongly agrees with IAWA that the chronic and sub-chronic standards are stand alone water quality standards. However, IAWA recognized problems that could result from use of certain types of sampling data and has suggested additional new regulatory language in the form of an equation that attempts to describe the relationship between the chronic and sub-chronic standards. The Illinois EPA has

reviewed this equation and believes it is a good method for addressing the problem identified. IAWA's equation provides a solution to a potential problem that four samples collected consecutively during one week could skew the results of the samples collected in the other three weeks of the 30 day period being evaluated to create an average that is not actually representative of the chronic averaging period. In reality, this equation is actually a method for evaluating attainment of the water quality standards under a certain set of circumstances where representative sampling has been done for both the sub-chronic and chronic standards, than it is a relationship between the two standards. The Illinois EPA has provided an example of how the equation proposed by IAWA can be used to evaluate attainment under the scenario described by IAWA in Exhibit A. Although the Illinois EPA supports the logic behind the equation identified by IAWA, it does not agree that this methodology for obtaining representative data should be included as part of the Board's regulation establishing ammonia water quality standards since this equation only addresses one possible concern with one possible type of data set and does not address other similar issues effecting the representativeness of data that have not yet been identified or considered.

Illinois EPA wants to clarify what is stated in IAWA's comments but not necessarily reflected in the proposed regulatory language. Each of these standards (acute, chronic, and sub-chronic) are intended to stand alone. If four samples have been taken four days in a row (any four days in a row), attainment of the acute and sub-chronic standards can be evaluated. If at least four samples representative of a 30 day period have been obtained, attainment of the acute and chronic standards (but not the sub-chronic standard) may be evaluated. Only if you have sufficient samples (minimum

of 7 samples – 4 in a row and 1 per week for 3 other weeks) would you utilize the equation proposed by IAWA. See Exhibit A.

There is one aspect of IAWA's proposed new Section 302.212(c)(4) that requires clarification. It is the Illinois EPA's interpretation that IAWA is presenting a formula for assigning weighted value to sub-chronic data when it is utilized to determine attainment with the chronic standard. As IAWA indicates in its testimony, the chronic and sub-chronic standards are stand alone standards and it is not necessary to have four consecutive days of data to evaluate attainment with the chronic standard. Nor is it necessary to have sufficient data to evaluate attainment with the chronic standard in order to evaluate attainment of the sub-chronic standard. The language in this subsection implies that it is to be used in every attainment determination for the chronic and/or sub-chronic standard. If IAWA intends that the formula presented in subsection (c)(4) must be used in every case in addition to the requirements of subsections (c)(1), (2) and (3), then the acute, chronic and sub-chronic water quality standards are no longer stand alone water quality standards. If the Board chooses to adopt the language suggested by IAWA as part of the ammonia water quality standards, the Illinois EPA recommends that the Board clarify this formula is an alternative method for evaluating attainment of the chronic standard that is used only with the type of data set required by the formula. One possible method for achieving this clarification might be to renumber IAWA's proposed Section 302.212(c)(4) to 302.212(f) and label the subsection "Representativeness of Data."

Recommended Regulatory Language and Conclusion

In order to assist the Board in development of a Second Notice Opinion and Order and to clarify the Illinois EPA's comments in this proceeding, suggested regulatory language for 35 Ill. Adm. Code 302.212 consistent with the comments provided above follows.

Section 302.212 Total Ammonia Nitrogen

- a) Total ammonia nitrogen (as N: STORET Number 00610) must in no case exceed 15 mg/L.
- b) Total ammonia nitrogen (as N: STORET Number 00610) acute, chronic and sub-chronic standards must be determined by the equations given below. Attainment of each standard must be determined by subsections (c) and (d) of this Section in mg/L.

- 1) The acute standard (AS) must be calculated using the following equation:

$$AS = \frac{0.411}{1 + 10^{7.204 - \text{pH}}} + \frac{58.4}{1 + 10^{\text{pH} - 7.204}}$$

- 2) The chronic standard (CS) must be calculated using the following equations:

A) During the Early Life Stage Present period, as defined in subsection (e) of this Section:

- i) When water temperature is less than or equal to 14.51°C:

$$CS = \left\{ \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right\} (2.85)$$

- ii) When water temperature is above 14.51°C:

$$CS = \left\{ \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right\} (1.45 * 10^{0.028 * (25 - T)})$$

Where T = Temperature, degrees Celsius

B) During the Early Life Stage Absent period, as defined in subsection (e) of this Section:

i) When water temperature is less than or equal to 7°C:

$$CS = \left\{ \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right\} (1.45 * 10^{0.504})$$

ii) When water temperature is greater than 7°C:

$$CS = \left\{ \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} \right\} (1.45 * 10^{0.028 * (25 - T)})$$

Where T = Temperature, degrees Celsius

3) The sub-chronic standard is equal to 2.5 times the chronic standard.

c) Attainment of the Total Ammonia Nitrogen Water Quality Standards

1) The acute standard of total ammonia nitrogen (in mg/L) must not be exceeded at any time except in those waters for which the Agency has approved a ZID pursuant to Section 302.102 of this Part.

2) The 30-day average concentration of total ammonia nitrogen (in mg/L) must not exceed the chronic standard (CS) except in those waters in which mixing is allowed pursuant to Section 302.102 of this Part. Attainment of the chronic standard (CS) is evaluated pursuant to subsection (d) of this Section by averaging at least four samples collected at weekly intervals or at other frequency distributions representative of a 30 day sampling period. The samples must be collected in a manner that assures a representative sampling period.

3) The four day average concentration of total ammonia nitrogen (in mg/L) must not exceed the sub-chronic standard except in those waters in which mixing is allowed pursuant to Section 302.102 of this Part. Attainment of the sub-chronic standard is evaluated pursuant to subsection (d) of this Section averaging daily sample results collected over a period of four consecutive days. The samples must be collected in a manner that assures a representative sampling period.

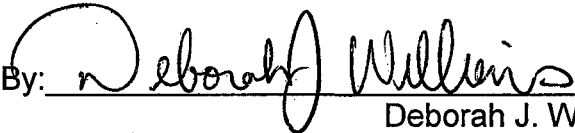
d) The water quality standard for each water body must be calculated based on the temperature and pH of the water body measured at the time of each ammonia sample. The concentration of total ammonia in each

sample must be divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

- e) The Early Life Stage Present period occurs from March through October. In addition, during any other period when early life stages are present, and where the water quality standard does not provide adequate protection for these organisms, the water body must meet the Early Life Stage Present water quality standard. All other periods are subject to the Early Life Stage Absent period.

The Illinois EPA again thanks the Board for the opportunity to participate in this rulemaking proceeding and hopes these comments provide additional clarity on some of the concerns raised by the Board at the two substantive public hearings held in this matter. If the Board has further questions or concerns, the Illinois EPA will be willing to submit additional information or participate in additional public hearings if necessary to develop a rulemaking that is consistent with the 1999 National Criteria Document and develops an ammonia nitrogen water quality standard for the State of Illinois that is protective of the health of early life stages of aquatic life in Illinois without causing unnecessary economic burdens on the regulated community.

Respectfully submitted,

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Dated: August 13, 2002

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Exhibit A

The following scenarios demonstrate how attainment of the proposed water quality standard is assessed. All scenarios assume that early life stages are present. The acute WQS was assessed for each sample collected. The sub-chronic WQS was assessed when there was one sample collected each day for four consecutive days. The chronic WQS was assessed when there were at least four samples collected at weekly intervals or at other frequency distributions representative of a 30-day sampling period. Scenario # 4 demonstrates how the chronic WQS was assessed when one sample was collected each day for four consecutive days and weekly samples were collected. This sampling regime contains data that would give undue weight to a small portion of the 30-day sampling period and therefore must be analyzed according to the method proposed by IAWA in the revised draft regulation.

Scenario 1:

Early life stages are present. Only 1 sample was collected.

	June 30
	Sample 1
Temperature °C	21.3
pH	8.16
Ammonia measured (mg/L)	5.8
Acute Standard (mg/L)	6.2
<i>Sub-chronic Standard (mg/L)</i>	<i>3.08</i>
<i>Chronic Standard (mg/L)</i>	<i>1.23</i>

In this example, only the acute Water Quality Standard (WQS) can be assessed. While the sub-chronic and chronic standards can be calculated given this data set, attainment of these standards cannot be assessed.

- The acute WQS is assessed as follows: The ammonia concentration in sample #1 is less than the acute WQS, therefore, the acute WQS was not violated.
- The sub-chronic WQS cannot be assessed.
- The chronic WQS cannot be assessed.

Scenario 2:

Early life stages are present. Four samples were collected. One sample was collected each day for four consecutive days. No other samples were collected.

	June 30	July 1	July 2	July 3
	Sample 1	Sample 2	Sample 3	Sample 4
Temperature °C	21.3	22.4	21.1	20.3
pH	8.16	8.25	7.98	7.85
Ammonia measured (mg/L)	5.8	3.0	2.1	1.8
Acute Standard (mg/L)	6.2	5.2	8.7	11.1
Sub-chronic Standard (mg/L)	3.08	2.50	4.10	5.15
<i>Chronic Standard (mg/L)</i>	<i>1.23</i>	<i>1.00</i>	<i>1.64</i>	<i>2.06</i>

In this example, the acute WQS can be assessed for each sample. The sub-chronic WQS can be assessed, since, one sample was collected each day for four consecutive days. The chronic WQS cannot be assessed, since; the samples were not collected in a way that would be representative of the 30-day averaging period.

- The acute WQS is assessed as follows: The ammonia concentration in all samples is less than the acute WQS for each sample; therefore, the acute WQS was not violated.
- The sub-chronic WQS is assessed as follows:

$$\text{Quotient} = ((5.8/3.08) + (3.0/2.5) + (2.1/4.1) + (1.8/5.15))/4$$

$$\text{Quotient} = (1.88 + 1.2 + 0.51 + 0.35)/4$$

$$\text{Quotient} = 0.99$$

Since the quotient is less than one, the sub-chronic WQS has been attained.

- The chronic WQS cannot be assessed.

Scenario 3:

Early life stages are present. Four samples were collected. One sample was collected each week for four weeks. No other samples were collected.

	June 28	July 6	July 12	July 21
	Sample 5	Sample 6	Sample 7	Sample 8
Temperature °C	21.7	22.2	19.3	20.6
pH	8.15	8.20	7.81	7.79
Ammonia measured (mg/L)	0.96	1.26	1.69	2.71
Acute Standard (mg/L)	6.3	5.7	11.9	12.4
<i>Sub-chronic Standard (mg/L)</i>	<i>3.05</i>	<i>2.73</i>	<i>5.78</i>	<i>5.45</i>
Chronic Standard (mg/L)	1.22	1.09	2.31	2.18

In this example, the acute WQS can be assessed for each sample. The sub-chronic WQS cannot be assessed, since the samples were not collected on consecutive days. The chronic WQS can be assessed, since; the samples were collected in a way that would be representative of the 30-day averaging period.

- The acute WQS is assessed as follows: The ammonia concentration in all samples is less than the acute WQS for each sample; therefore, the acute WQS was not violated.
- The sub-chronic WQS cannot be assessed.
- The chronic WQS is assessed as follows:

$$\text{Quotient} = ((0.96/1.22) + (1.26/1.09) + (1.69/2.31) + (2.71/2.18))/4$$

$$\text{Quotient} = (0.79 + 1.16 + 0.73 + 1.24)/4$$

$$\text{Quotient} = 0.98$$

Since the quotient is less than one, the chronic WQS has been attained.

Scenario 4:

Early life stages are present. Eight samples were collected. One sample was collected each week for 4 weeks and one sample was collected each day for four consecutive days. No other samples were collected.

	June 28	June 30	July 1	July 2	July 3	July 6	July 12	July 21
	Sample 5	Sample 1	Sample 2	Sample 3	Sample 4	Sample 6	Sample 7	Sample 8
Temperature °C	21.7	21.3	22.4	21.1	20.3	22.2	19.3	20.6
pH	8.15	8.16	8.25	7.98	7.85	8.20	7.81	7.79
Ammonia measured (mg/L)	0.96	5.8	3.0	2.1	1.8	1.26	1.69	2.71
Acute Standard (mg/L)	6.3	6.2	5.2	8.7	11.1	5.7	11.9	12.4
Sub-chronic Standard (mg/L)	3.05	3.08	2.50	4.10	5.15	2.73	5.78	5.45
Chronic Standard (mg/L)	1.22	1.23	1.00	1.64	2.06	1.09	2.31	2.18

In this example, the acute WQS can be assessed for each sample. The sub-chronic WQS can be assessed for the four samples that were collected on consecutive days. The chronic WQS can be assessed, since; the samples were collected in a way that would be representative of the 30-day averaging period.

- The acute WQS is assessed as follows: The ammonia concentration in all samples is less than the acute WQS for each sample; therefore, the acute WQS was not violated.
- The sub-chronic WQS is assessed as follows:

$$\text{Quotient} = ((5.8/3.08) + (3.0/2.5) + (2.1/4.1) + (1.8/5.15))/4$$

$$\text{Quotient} = (1.88 + 1.2 + 0.51 + 0.35)/4$$

$$\text{Quotient} = 0.99$$

Since the quotient is less than one, the sub-chronic WQS has been attained.

- Since the samples were not taken in a representative fashion, the consecutive samples must be accounted for specially. As proposed by IAWA in the revised draft regulation, the chronic WQS is assessed as follows:

$$\text{Quotient} = (4/30)*(\text{quotient 4 days}) + (26/30)*(\text{quotient remaining})$$

$$\text{Quotient} = ((0.133)*((5.8/1.23)+(3.0/1.0)+(2.1/1.64)+(1.8/2.06)/4) + ((0.867)*((0.96/1.22)+(1.26/1.09)+(1.69/2.31)+(2.71/2.18)/4)$$

$$\text{Quotient} = ((0.133)*(2.46) + (0.867)*(0.98)$$

$$\text{Quotient} = 1.18$$

Since the quotient is greater than one, the chronic WQS has been exceeded.

Scenario 5:

Early life stages are present. Eight samples were collected. Two samples were collected each week for four weeks. No other samples were collected.

	June 24	June 28	July 1	July 5	July 8	July 12	July 15	July 19
	Sample 9	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16
Temperature °C	21.7	21.3	22.4	21.1	20.3	22.2	19.3	20.6
pH	8.15	8.16	8.25	7.98	7.85	8.20	7.81	7.79
Ammonia measured (mg/L)	0.96	2.5	0.8	1.1	1.8	0.36	0.89	2.71
Acute Standard (mg/L)	6.3	6.2	5.2	8.7	11.1	5.7	11.9	12.4
<i>Sub-chronic Standard (mg/L)</i>	<i>3.05</i>	<i>3.08</i>	<i>2.50</i>	<i>4.10</i>	<i>5.15</i>	<i>2.73</i>	<i>5.78</i>	<i>5.45</i>
Chronic Standard (mg/L)	1.22	1.23	1.00	1.64	2.06	1.09	2.31	2.18

In this example, the acute WQS can be assessed for each sample. The sub-chronic WQS cannot be assessed, since, the samples were not collected on consecutive days. The chronic WQS can be assessed, since; the samples were collected in a way that would be representative of the 30-day averaging period.

- The acute WQS is assessed as follows: The ammonia concentration in all samples is less than the acute WQS for each sample; therefore, the acute WQS was not violated.
- The sub-chronic WQS cannot be assessed.
- The chronic WQS is assessed as follows:

$$\text{Quotient} = ((0.96/1.22)+(2.5/1.23)+(0.8/1.0)+(1.1/1.64)+(1.8/2.06)+(0.36/1.09)+(0.89/2.31)+(2.71/2.18))/8$$

$$\text{Quotient} = (0.79 + 2.03 + 0.8 + 0.67 + 0.87 + 0.33 + 0.39 + 1.24)/8$$

$$\text{Quotient} = 0.89$$

Since the quotient is less than one, the chronic WQS has been attained.

STATE OF ILLINOIS

COUNTY OF SANGAMON

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)
) SS
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)

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached **COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** upon the person to whom it is directed, by placing a copy in an envelope addressed to:

Please see attached service list.

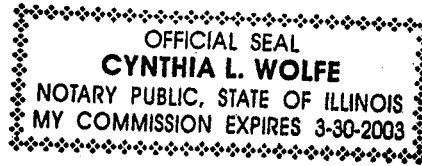
and mailing it from Springfield, Illinois on August 13, 2002 with sufficient postage affixed as indicated above.

Nancy J D Lamport

SUBSCRIBED AND SWORN TO BEFORE ME

this 13~~th~~ day of August 2002

Cynthia L. Wolfe
Notary Public



SERVICE LIST
R02-19
August 13, 2002

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