

ILLINOIS POLLUTION CONTROL BOARD
February 14, 1974

IN THE MATTER OF)
WATER POLLUTION REGULATION) R73-1
AMENDMENTS)
)

OPINION AND ORDER OF THE BOARD (by Mr. Dumelle):

This matter concerns amendments to certain rules of the Illinois Pollution Control Board Rules and Regulations, Chapter 3, Water Pollution.

Chronology of Events

Amendments to the Water Regulations were proposed by the Illinois Environmental Protection Agency (Agency) on February 20, 1973. The proposal, published in Board Newsletter #61, with one exception was "intended to meet objections to existing Illinois Water Pollution Regulations raised in the January 16, 1973 letter from Mr. Francis T. Mayo, Regional Administrator, Region V, U.S. Environmental Protection Agency (USEPA) to Governor Daniel Walker." The exception was the additional proposal by the Agency to revoke Rule 921(d) of Chapter 3. Specific amendments proposed by the Agency were the following:

Amend Rule 104 (Definitions) as follows:

"Restricted-Use" means certain designed waters which are not protected for aquatic life;

Amend Rule 201(b) (Mixing Zones) as follows:

- (b) In addition to the above, for waters designed for aquatic life-(General Standards); the mixing zone shall be so designed as to assure a reasonable zone of passage of aquatic life in which the water quality standards are met. The mixing zones shall not intersect any area of any such waters in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected, nor shall any mixing zone contain more than 25% of the cross-sectional area and/or volume of flow of a stream.

Amend Rule 203(c) as follows:

- (c) Phosphorus (STORET number - 00665); Phosphorus as P shall not exceed 0.1 mg/l in any waters of the State, nor shall it exceed 0.05 mg/l in any reservoir or lake, or in any stream at the point where it enters any reservoir or lake.

Amend Rule 203(h) as follows:

- (h) Any substance toxic to aquatic life shall not exceed one-tenth of the 48-hour 96-hour median tolerance limit (48-hr. 96-hr. TLM) for native fish or essential fish food organisms.

Amend Rule 205 as follows:

205 Restricted-Use-Standards
Secondary Contact and Indigenous Aquatic Life Standards

Water designated in Part III of this Chapter for Restricted Use as Secondary Contact and Indigenous Aquatic Life Waters shall meet the following standards:

- (c) Dissolved oxygen (STORET number - 00300) shall not be less than 4.0 mg/l at any time 3.0 mg/l during at least 16 hours in any 24-hour period; nor less than 2.0 mg/l at any time.
- (g) Phosphorus (STORET number - 00665): Phosphorus as P shall not exceed 0.1 mg/l in any waters of the State, nor shall it exceed 0.05 mg/l in any reservoir or lake, or in any stream at the point where it enters any reservoir or lake.
- (h) Any substance toxic to aquatic life shall not exceed one-tenth of the 96-hour median tolerance limit (96-hr. TLM) for native fish or essential fish food organisms.

Amend Rule 301 as follows:

301 General Use Waters

All waters of the State of Illinois are designated for general use except those designated as Restricted-Use Waters; secondary contact and indigenous aquatic life waters.

Amend Rule 302 as follows:

302 Restricted-Use-Waters
Secondary Contact and Indigenous Aquatic Life Waters

Secondary contact and indigenous aquatic life waters are those waters which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the applicable standards. The following are designated as restricted-use-waters secondary contact and indigenous aquatic life waters:

Amend Rule 303 as follows:

303 Public and Food Processing Water Supply

All waters of Illinois are designated for Public and Food Processing Water Supply use except those designated as Restricted-Use-Waters, secondary contact and indigenous aquatic life waters, and except for the following:

- (a) The Chicago River;
- (b) The Little Calumet River.

Amend Rule 921 as follows:

921 Standards for Issuance

The Agency shall not grant any permit required by this Part, except an Experimental Permit under Rule 907, unless the applicant submits adequate proof that the treatment works, sewer, and wastewater source:

- (d) ~~if-subject-to-a-future-compliance-date;-the-applicant-has-an-approved-Project-Completion-Schedule-in-accordance-with-the-provisions-of-Rule-1002.~~

Hearings on the proposed amendments were held at the following locations:

March 27, 1973	Chicago, Ill.
March 28, 1973 continued to	
March 30, 1973	Chicago, Ill.
April 10, 1973	Carbondale, Ill.
April 11, 1973	Springfield, Ill.
May 4, 1973	Chicago, Ill.

At the hearing on April 10 the Agency presented several revisions to their original proposal. These revisions are listed below.

Amend Rule 201(b) (Mixing Zones) as follows:

- (b) In addition to the above, ~~for waters designated for aquatic life (General Standards)~~, the mixing zone shall be so designed as to assure a reasonable zone of passage for aquatic life in which the water quality standards are met. The mixing zones shall not intersect any area of any such waters in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected, nor shall any mixing zone contain more than 25% of the cross-sectional area and/or volume of flow of a stream. For contaminants other than those for which numerical standards have been established, the 96-hour TLM for indigenous fish or essential fishfood organisms, whichever is more stringent, shall not be exceeded at any point in the mixing zone. (mean tolerance level (TLM) is the concentration at which there is a 50% mortality rate to bioassay test organisms)

Amend Rule 203(h) as follows:

- (h) ~~Any substance toxic to aquatic life shall not exceed one-tenth of the 48-hour median tolerance limit (48-hr. TLM) for native fish or essential fish-feed organisms.~~ For contaminants other than those for which numerical standards have been established, one-tenth of the 96-hr. TLM for indigenous fish or essential fish food organisms, whichever is more stringent, shall not be exceeded. (mean tolerance level (TLM) is the concentration at which there is 50% mortality rate to bioassay test organisms)

Amend Rule 205 as follows:

- (h) For contaminants other than those for which numerical standards have been established, one-tenth of the 96-hr. TLM for indigenous fish or essential fishfood organisms, whichever is more stringent, shall not be exceeded. (mean tolerance level (TLM) is the concentration at which there is 50% mortality rate to bioassay test organisms)

During the hearings, the USEPA position on phosphorus (P) was clarified. Exhibit 91, a letter with enclosures from Adamkus to Lawton dated April 13, 1973 established Federal policy:

"during this current revision period, we will require only those phosphorus amendments defined in the hearing statement of Mr. Potos of my staff before the Board on March 28, 1973, that is 0.2 mg/l as total P for free flowing streams and 0.05 mg/l as total P for lakes exclusive of Lake Michigan as a goal to be met in 1983. In Lake Michigan, the present Illinois water quality standard is adequate to protect against a culturally accelerated trophic state."

The letter goes on to urge the adoption of the Federal phosphorus requirement.

Agency Role

The Agency made it clear from the outset that it supported, generally, the suggestions made by the USEPA with the exception of the proposed phosphorus standard in Rule 203(c). The Agency reminded the Board that it, the Board, had considered a stream standard for phosphorus during the 1971 and 1972 Water Pollution hearings and had concluded that there was no need for such a standard. In addition the Agency during the hearing on R73-1 felt that there was no new evidence that would support the need for a phosphorus standard (R. 3/27 p. 8-10). Therefore, the bulk of the affirmative testimony, especially in the area of phosphorus, was presented by USEPA witnesses.

Findings of the Pollution Control Board

A rule by rule discussion of the proposed amendments follows:

1. Rule 104 Definitions

The proposal was to delete the definition of Restricted Use Water. This particular amendment along with amendments to Rule 205 and 302 proposed by the Agency were:

"intended to bring Illinois standards into as close conformance with Federal policy as is possible. First, it is proposed that the designation "restricted use" be replaced with the more specific and descriptive designation of "secondary contact and indigenous aquatic life use". The Rule 104 definition of restricted use, which states that these waters are "not protected for aquatic life", is eliminated. These waters presently do support indigenous aquatic life and the variety and numbers of the aquatic population will increase as presently required upgrading takes place. The new classification more accurately points out the beneficial uses of secondary contact and certain aquatic populations for which these waters are expected to be utilized." (Ex. 1 p. 11)

We support the position of the Agency and adopt this amendment.

2. Rule 201(b)

This proposed amendment qualifies more precisely the maximum size of mixing zones in relation to the receiving stream and also sets toxicity limits within the mixing zones. Much testimony concerned both the proposed 25% maximum extent and the 96-hr. TLm toxicity limit.

One major problem is what happens in low dilution receiving waters. The proposed rule "nor shall any mixing zone contain more than 25% of the cross-sectional area and/or volume of flow of a stream"; on a flow basis seems to set a lower dilution ratio between receiving stream and discharge of 3:1. It is obvious, based on testimony from the Metropolitan Sanitary District of Greater Chicago (MSD) and others that many discharges are to intermittent streams or streams having dilution ratios lower than 3:1. For example the North Side Plant of the MSD discharges 400 MGD to the North Channel where the dilution during 1971-1972 was never 3:1 (R. 3/30 p. 8,9). On the cross-sectional area requirement, the North Channel is only 38 feet wide and the MSD "could not conceive of a physical structure that would give us this mixing of this tremendous volume in this short a span." (R. 3/31 p. 47). The USEPA requirement for a 25% maximum mixing zone is based on recommendations of the National Technical Advisory Committee as contained in a report called Water Quality Criteria, 1968 also known as the Green Book (R. 3/30 p. 101). However, a revised water quality criteria document prepared by the National Academy of Science is being published by the USEPA. A portion of the final draft of this document, known as the Blue Book, entered into the record as exhibit 80, contains the following recommendations for mixing zones and zones of passage (ex. 80(a), p. 19, 21).

Recommendation (Mixing Zones)

"It is recommended that the total area or volume of a receiving system assigned to mixing zones be limited to that which will: (1) not interfere with biological communities or populations of important species to a degree which is damaging to the ecosystem; (2) not diminish other beneficial uses disproportionately.

Recommendation (Zones of Passage)

"Because of varying local physical and chemical conditions and biological phenomena no single-value recommendation can be made on the percentage of river width necessary to allow passage of critical free-swimming and drifting organisms

so that negligible or no effects are produced on their populations. As a guideline no more than 2/3 the width of a water-body should be devoted to mixing zones. Thus leaving at least 1/3 free as a zone of passage".

The Board was thus faced with changing Federal guidelines as well as problems in complying with the proposed amendment.

Ralph Evans of the Illinois State Water Survey had the following thoughts about the proposed limits on mixing zones (R. 4/11 p. 124):

"It is not reasonable to believe, however, that the criteria for mixing zones developed by the National Technical Advisory Committee in 1968 and being considered today, was intended to create adequate passageways where none exist naturally.

Under 7-day 10-year low flow stream conditions, the only flow in many stream beds in Illinois will be treated waste effluents. With these situations in mind any amendment to Rule 201(b) incorporating the U.S. EPA requirements should be qualified. As a suggestion the following is offered:

In addition to the above, (and this is the wording of qualification to any amendment) except in waters where by reason of low flow or other conditions the migration and the free movement of aquatic biota is not possible in the absence of an effluent the mixing zone shall be limited to assure adequate passageways for the movement or drift of aquatic biota."

The Board believes that mixing zones should be limited as much as possible to avoid circumventing the water quality standards. At the same time we understand the problems of dischargers on low dilution streams. Therefore the Board sets a mixing zone limit of 25% on the cross-sectional area or volume of flow for those discharges where the dilution ratio is 3:1 or greater. Discharges to streams having less than 3:1 dilution, like everyone else, already have to meet the applicable water quality standards outside the mixing zone and thus these discharges to low dilution streams are required to meet a tighter effluent standard.

On the proposal to require a toxicity limit of a 96-hour TLM (median tolerance limit) concentration in the mixing zone, the Board does not adopt this amendment. Dr. Brungs of the National Water Quality Laboratory testified as to the need for toxicity limits within mixing zones because some aquatic organisms are attracted

to lethal conditions. (R. 3/28 p. 103, 104) The Green Book, however, does not include recommendations for TLM concentrations within mixing zones (R. 3/28 p. 200, 201). A mixing zone is an opportunity for pollutants to disperse. It is a limited region where pollution controlled by effluent regulations can disperse to meet the water quality regulations. Setting toxicity limits in mixing zones largely negates the purpose of a mixing zone and a limit of a 96-hour TLM may or may not be consistent with our existing effluent and water quality regulations.

3. Rule 203(c)

The proposal was to set a phosphorus limit of 0.1 mg/l as P on those waters of the state not already regulated. As mentioned previously the USEPA clarified its requirements during the hearings. Chris Potos' testimony of March 28 gives their position (R. 3/28 p. 27-29).

"Although the U.S. Environmental Protection Agency recognizes the need for a phosphorus water quality standard now, because of the economics involved, especially as it relates to future operating costs and small communities, we will agree to the adoption of the standard defined below as a goal to be met in 1983."

and further:

"Criteria equal to or more stringent than the following Federal requirements are considered consistent with the Federal requirements and as such Federally approvable.

- | | | |
|-----|---|---------------------------------------|
| (1) | Free flowing streams | 200 micrograms per liter (0.2 mg/l) |
| (2) | Stream at point where it enters the lake or impoundment | 50 micrograms per liter (0.05 mg/l) |
| (3) | Reservoir or lake | 25 micrograms per liter" (0.025 mg/l) |

The Board already has regulations that meet or exceed the requirements of (2) and also (3) for Lake Michigan. Based on the 1983 data for the proposed phosphorus standard, the Board will not adopt the phosphorus proposal at this time.

The hearings did not convince the Board that a phosphorus standard of 0.2 mg/l for streams is necessary. The reason for establishing phosphorus limits is to prevent excess nutrient levels which can cause eutrophication or algal blooms. There was question, however, of the correlation between phosphorus levels and excess growths (R. 4/11 p. 80); as most tests being performed to assess the role of nutrients on eutrophication have not isolated phosphorus as an independent variable (R. 3/28, p. 273, 274) in order to establish the effect of a low phosphorus level in the presence of other nutrients. There was also testimony by the MSD and others that technology for phosphorus removal to the proposed levels (approximately 98% removal) is not known to be consistently possible (R. 3/30 p. 207, 208), and is expensive due to the costs for chemicals and sludge handling (R. 4/11 p. 210).

In addition, the turbidity of most streams, caused by silting, barge traffic, stormwater overflows, and poorly treated effluents prevents the penetration of light into the waters sufficiently to inhibit photosynthesis on most waters of the State. The result as explained by Ralph Evans is that studies of various streams show most phosphorus concentrations exceeding 0.2 mg/l but an absence of nuisance algal blooms so that

"it is our (State Water Survey) opinion that the water quality of Illinois streams will not suffer from the absence of regulations limiting phosphorus concentrations in them." (R. 4/11 p. 117-123)

4. Rule 203(h)

The proposed amendment would change the toxicity concentration from 1/10 the 48-hr. TLM to 1/10 the 96-hr. TLM for general use waters. This proposal at least during the hearings did not generate much controversy other than Edison's concern with its application to thermal discharges. The basis for the proposal is that toxicity information is often in terms of 96-hour exposures and that this amendment further upgrades the water quality. It also reflects past Agency policy as contained in TR20-23. (R. 3/27 P. 27) The USEPA in supporting the change from a 48-hour TLM to a 96-hr. TLM said that the change "will result in a more meaningful number and also one that would, with proper use, be more protective of aquatic life" (R. 3/28 p. 115). The MSD would not object to this amendment since the 96-hour TLM value is utilized in most toxicity work and most application factors are based on 96-hr. TLM values.

The MSD and others, however, point out the vagueness of this rule since "specifics as to procedures and methods of determining TLM values are not given. In particular values should be determined with native or indigenous test organisms in a flow through test" (R. 3/30 p. 11). The problems here is the word "indigenous". Much of the Chicago waterway system for example, is artificial, being constructed for the purpose of moving sewage from the Lake Michigan Basin to the Mississippi River. The indigenous aquatic organisms in these waterways are pollution tolerant organisms. The USEPA, however, defines indigenous as "those aquatic organisms that would normally be present in an area based upon temperature and geography and geophysics, whatever you have, and not based upon any polluted conditions" (R. 3/28 p. 56).

The Board proposed, in a draft regulation published in Newsletter #75, to delete Rule 203(h) in its entirety, feeling that it was possibly vague and unconstitutional since no contaminants are listed by name or allowable concentration. The discharger would not know what was expected of him unless he performed exhaustive (and continuing) literature reviews. A great deal of correspondence was then generated by the Board's deletion proposal for this Rule.

On November 26, 1973 the Regional Administrator of the U.S. EPA stated that "the general toxicity limits within the water quality standard cannot be deemed unconstitutional." The Board, in a letter of December 3, 1973 asked for citations of actual court cases in which TLM provisions had been upheld on constitutional grounds. A reply on December 6, 1973 listed only 16 states of the 50 as now having TLM standards and stated further

To our knowledge, since initiation of the water quality standards program in 1965, and considered on a national basis, there has never been a court case involving the constitutionality of any general toxicity standard (emphasis added).

A December 19, 1973 letter from the U.S. EPA Regional Counsel discussed the vagueness argument and stated that due process did not require "absolute advance and precise certainty" where there was no right to use the waters of the State as the discharger saw fit.

The Board, in this proceeding, retains Rule 203(h) in its old form, but retains strong doubts about its vagueness. In future proceedings, the Illinois EPA or the U.S. EPA should put into a Board record the contaminants and their allowable concentrations and the feasibility, both economic and technological of meeting and measuring those levels. While we feel the record is not sufficient to delete Rule 203(h) we do not feel it adequate to delete the Rule or to substitute tables of substances and concentrations gleaned from the "Green Book" (now 6 years old) or the "Blue Book" (still in the comment stage).

The Board therefore does not adopt the proposed amendment and recognizes the problems of a discharger in attempting to comply with the existing 203(h).

5. Rule 205

There were several proposed amendments within this rule.

The Board adopts the change in title to Secondary Contact and Indigenous Aquatic Life Standards. The factors in reaching this decision were covered previously under item 1.

Rule 205(c):

The Agency states in its proposal to raise the minimum dissolved oxygen (DO) level to 4.0 mg/l that

"The present standard reflects actual existing conditions. The proposed standard represents the dissolved oxygen levels which can reasonably be anticipated to be maintained in these waters, once the major upstream dischargers have complied with the advanced treatment, nitrogen removal and storm overflow requirements of the Regulations. Based upon present technological limitations, the enormous cost of the contemplated improvements necessary to meet the proposed standard, the physical nature of these specific bodies of water and the fact that the flows in these bodies of water is almost entirely treated effluent, the Agency does not believe that a higher dissolved oxygen standard could be proposed or justified at this time." (ex. 1)

The MSD, the major discharger into these waters, supports an increase in DO as long as the compliance date is delayed in order for them to get their planned system improvements on line. Specific items include nitrogen removal facilities, tertiary treatment, storm overflow elimination, and instream aeration. Because of the magnitude of these projects, the target completion date is not until December 31, 1977 (ex. 12).

The USEPA characterizes the proposed 4 mg/l DO standard as "minimal" since it would be partially lethal to fish larvae. They recognize however, that for the types of water under consideration "if they (aquatic life) get a DO of four, I imagine they might go out and celebrate", and further, "I would say it (a DO of 4.0 mg/l) is a good interim minimal condition" (R. 3/28 p. 183, 194).

The Board adopts the proposed DO standard of 4.0 mg/l with the compliance date of December 31, 1977, recognizing the close connection between discharger improvements and water quality for these particular waters of the state.

Rule 205(g): The Board does not adopt a phosphorus standard for the reasons given under Item 3.

Rule 205(h): The Board does not adopt a 1/10 of the 96-hr TLM regulation due to the uncertainties discussed under Item 4.

6. Rule 301

The proposal to change the term "Restricted Use" to "Secondary Contact and Indigenous Aquatic Life Use" is adopted by the Board for the reasons given in Item 1.

7. Rule 302

The title and language change are adopted by the Board for the reasons given in Item 1. Another point here is that contaminants not in excess of the water quality standards help determine the existence of indigenous aquatic life. As discussed previously, the USEPA would characterize "indigenous" as those present if there were not contaminants.

8. Rule 303

The proposed language change is adopted by the Board for the reasons given in Item 1.

9. Rule 921(d)

The Board adopted this proposal to delete Rule 921(d) on June 28, 1973. This adoption corrects a situation in which the Regulations are creating a further delay in compliance with the upgrading requirements of the Regulations. It should be noted that revocation of 921(d) does not relieve dischargers of the obligation of filing a Project Completion Schedule (PCS). This is still specifically required by Rule 1002. The purpose of the amendment is to eliminate the undesirable and unintended impediment to the goal of eliminating pollution from the waters of Illinois.

ORDER OF THE BOARD (Adopted January 31, 1974)

1. Rule 104 Definitions

Delete the definition of "Restricted Use"

2. Rule 201 (b) shall be amended as follows:

(b) In addition to the above for-water-designated for-aquatic-life-(General-Standards), the mixing zone shall be so designed as to assure a reasonable zone of passage for aquatic life in which the water quality standards are met. The mixing zones shall not intersect any area of any such waters in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected, nor shall any mixing zone contain more than 25% of the cross-sectional area or volume of flow of a stream except for those streams where the dilution ratio is less than 3:1.

3. Rule 205 Restricted Use Standards

Change the title of this Rule to "Secondary Contact and Indigenous Aquatic Life Standards" and insert "Secondary Contact and Indigenous Aquatic Life" in place of "Restricted Use" in the foreword.

4. Rule 205(c) shall be amended as follows:

(c) Dissolved oxygen (STORET number - 00300) shall not be less than 3.0 mg/l during at least 16 hours in any 24-hour period, nor less than 2.0 mg/l at any time, and after December 31, 1977 shall not be less than 4.0 mg/l at any time.

5. Rule 301 General Use Waters shall be amended as follows:

All waters of the State of Illinois are designated for general use except those designated as Restricted-Use-Waters; Secondary Contact and Indigenous Aquatic Life Waters.

6. Rule 302 Restricted Use Waters shall be amended as follows:

302 Restricted-Use-Waters
Secondary Contact and Indigenous Aquatic Life Waters

Secondary Contact and Indigenous Aquatic Life Waters are those waters which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water and the presence of contaminants in amounts that do not exceed the applicable standards. The following are designated as restricted-use-waters - Secondary Contact and Indigenous Aquatic Life Waters:

7. Rule 303 Public and Food Processing Water Supply shall be amended as follows:

A. All waters of Illinois are designated for Public and Food Processing Water Supply use except those designated as Restricted-Use-Waters, Secondary Contact and Indigenous Aquatic Life Waters, and except for the following.

- (a) The Chicago River;
- (b) The Little Calumet River.

(T IS SO ORDERED.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion was adopted on the 14th day of February, 1974 by a vote of 5-0.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Order was adopted on the 31st day of January, 1974 by a vote of 5-0.


Christan L. Moffett, Clerk
Illinois Pollution Control Board