

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

WATER QUALITY AMENDMENTS TO)
35 Ill. Adm. Code 302.208(e)-(g), 302.504(a),) R02- 11
302.575(d), 303.444, 309.141(h); and) (Rulemaking - Water)
PROPOSED 35 Ill. Adm. Code 301.267,)
301.313, 301.413, 304.120, and 309.157)

STATEMENT OF REASONS

The Illinois Environmental Protection Agency (“Agency” or “Illinois EPA”) hereby submits its Statement of Reasons for the above-captioned proceeding to the Illinois Pollution Control Board (“Board”) pursuant to Section 27 of the Illinois Environmental Protection Act (“Act”), 415 ILCS 5/27 (2000), and 35 Ill. Adm. Code 102.200 and 102.202.

I. Statutory Basis

Pursuant to the Federal Water Pollution Control Act, 33 U.S.C. §§1251-1387, also known as the Clean Water Act (“CWA”) §§101-607, states are required to revise and update their water quality standards to ensure that standards are protective of public health or welfare, enhance the quality of water and promote the purposes of the CWA. 33 U.S.C. §1313(c)(2)(A). To establish new and revised standards, the State must consider the waters use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and navigational purposes. 33 U.S.C. §1313(c)(2)(A). The process of reviewing a state’s standards is commonly known as a “triennial water quality standards review.” 33 U.S.C. §1313(c)(1).

The Illinois EPA’s triennial water quality standard review refines the numeric standards found at 35 Ill. Adm. Code 302.208 based on the best available current knowledge. This effort ensures that toxic substances in toxic amounts do not impact the waters of Illinois. In the past, the

Agency proposed similar triennial reviews to the Board when the new information became available. For example, in In the Matter of Proposed Amendments to Title 35, Subtitle C (Toxic Control), R88-21, Docket A (January 25, 1990), the Board adopted and amended numeric water quality standards for several parameters. The R88-21 Docket A amendments were triggered by advances in the sciences of toxicology and chemical detection. These amendments introduced a “two-number standard system,” instead of the then existing “single-number system.” Regarding this new system, the Board stated that, “[t]his approach is meritorious because it addresses both acute effects caused by high-dose, short term exposure to a pollutant, and chronic effects produced by low-dose, long-term constant exposure.” Id.

II. Introduction

Today’s proposal contains the Illinois EPA’s revisions to its water quality standards based on the revised federal policy and new scientific information collected over the years. This new information allowed the Illinois EPA to propose new aquatic life acute and chronic numeric standards for benzene, ethyl benzene, toluene, and xylene (“BETX”). Until now, the Illinois EPA used the water quality criteria provided by Section 302.210, Other Toxic Substances, to regulate BTEX as water quality based effluent limits in National Pollutant Discharge Elimination System (“NPDES”) permits.

The proposal also revises the water quality standards for zinc, nickel and cyanide to reflect the values that are currently considered as protective of the aquatic life. Additionally, based on new information provided by the United States Environmental Protection Agency’s (“USEPA”) guidance *The Metals Translator: Guidance for Calculating A Total Recoverable Permit Limit From A Dissolved Criterion*. EPA 823-B-96-007 (USEPA 1996) that only the dissolved fraction of metals is toxic to the aquatic life (*See Exhibit A, p. 1*), the Illinois EPA is proposing the metals water quality

standards in dissolved form.

Corrections to the Great Lakes Water Quality Standards Initiative (“GLI”) Rulemaking (R97-25) are also proposed. The Illinois EPA inadvertently omitted the sigma sign in the target species value (“TSV”) equation in the procedure for the wildlife criterion and the inclusion of the conversion factors to derive the dissolved metals standards in its proposal to the Board. This proposal corrects that error and adds a new section to ensure that a consistent concept of the metals translator procedure is applied to all waters.

Finally, the Illinois EPA is proposing to amend Section 304.120 of the Board regulations to ensure compliance with the effluent limitations provided under Sections 301 and 302 of the Clean Water Act. Under the amended rule, the Illinois EPA will implement the use of CBOD₅ instead of BOD₅ in NPDES permits regulating treated domestic and municipal waste.

III. Regulatory Proposal

A. Purpose and Effect of Regulatory Proposal

As discussed above, the purpose of this proposal is to fulfill the requirements of Section 303(c) of the Clean Water Act, which requires that states must from time to time, at least once every three years, review water quality standards to ensure that these standards are based on the most current information and are protective of the designated uses of waters of the state. Also, this proposal makes corrections to a formula for derivation of wildlife water quality criteria and to the water quality standards for metals applicable to Lake Michigan Basin. Under this proposal, the Agency would be able to regulate CBOD₅, instead of BOD₅, in treated domestic waste effluents. Specifically, the proposal contains the following amendments:

I. BETX The Agency is proposing adoption of new aquatic life acute and chronic water

quality standards for benzene, ethyl benzene, toluene and xylene(s) (“BETX”) for both General Use waters and the Lake Michigan Basin. Formerly, BETX substances were regulated using water quality criteria derived from 35 Ill. Adm. Code 302.210 and Subpart F. Over the years, these water quality criteria have changed due to discovery of new toxicity data in the literature, recalculation of the criteria, and correction of errors in the database used. Because these substances are frequently regulated in NPDES permits using these derived criteria, the Agency is proposing adoption of the numeric water quality standards at Sections 302.208(e) and (f), and 302.504(a).

- II. Metals and Weak Acid Dissociable Cyanide The existing single number water quality standards for zinc and nickel at Section 302.208(g) are outdated as they do not conform to the current method of designating both acute and chronic values for protection of aquatic life. The revised aquatic life acute and chronic water quality standards for zinc and nickel are proposed as additions to Section 302.208(e). The Agency used USEPA’s national criteria documents for zinc *Ambient Water Quality Criteria for Zinc – 1987* EPA-440/5-87-003 (USEPA 1987) (*See Exhibit B*) and nickel *Ambient Water Quality Criteria for Nickel – 1986* EPA-440/5-86-004 (USEPA 1986) (*See Exhibit C*) and new information to arrive at the proposed standards.

This proposal also contains revised aquatic life acute and chronic water quality standards for general use weak acid dissociable cyanide. The general use weak acid dissociable standard adopted by the Board in R88-21, 1990, were derived utilizing cold-water species. However, that standard is applied to waters that contain only warm, or in some cases cool water species. The revised standard for weak acid dissociable cyanide corrects this error and is intended to be protective of all species found in General Use waters.

III. Dissolved Metals Standards The conversion of General Use metals water quality standards from total to dissolved form is proposed because of the USEPA's (USEPA 1996) (See Exhibit A) recommendation and the national consensus that only the dissolved fraction of metals present in a solution is the toxic component. These dissolved metals water quality standards would require the use of the metals translator procedure (USEPA 1996) (See Exhibit A) to set NPDES permit limits for metals in total form. The permit limits for total metals, however, must ensure protection of the dissolved metal water quality standard in the receiving stream. The proposed Section 309.157 contains a concept that would allow the Agency to set permit limits based on site-specific metals data upon the permit applicant's request. The Agency will draft an implementation rule to allow the administration of the metals translator process for determining water quality based permit limitations for NPDES discharges to general use waters.

IV. Corrections to Lake Michigan Basin Water Quality Standards for Metals The metals water quality standards applicable to the Lake Michigan Basin were adopted by the Board in the GLI rulemaking (R97-25). The standards for arsenic, cadmium, lead, etc. have now been corrected to include the dissolved conversion factor. Also, in that rulemaking, the Agency inadvertently omitted the sigma sign in the calculation of TSV equation in its proposal to the Board. The Agency now proposes correcting those errors. The Agency has elected to use new conversion factors in some cases, rather than the GLI values (*Final Water Quality Guidance for the Great Lakes System*; Final Rule, Federal Register, Vol. 60, No. 56, March 23, 1995: 15391-15392.) (USEPA 1995a) (See Exhibit D). The proposal also adds a regulation, Section 309.157 that allows use of the metals translator in all waters where dissolved metals water quality standards exist, thereby

making Section 309.141(h)(3) extraneous as it applied only in Lake Michigan Basin waters.

- V. Updated Effluent Standard for Biochemical Oxygen Demand The existing effluent standards at 35 Ill. Adm. Code 304.120 require the Agency to regulate five-day biochemical oxygen demand (“BOD₅”). However, the federal regulations promulgated several years ago (40 CFR 133 as published on September 20, 1984) allow states to regulate only the carbonaceous component of BOD₅ (“CBOD₅”) in treated domestic waste effluents. The Agency has generally been regulating CBOD₅ for many years in these effluents, consistent with the federal regulations. However, it has not corrected the inconsistency in the Board regulations. The CBOD₅ method, by inhibition of nitrogen demand, provides a more direct and reliable measure of carbonaceous demand. The Agency proposes to update the Board regulations to reflect that CBOD₅ should be regulated in NPDES permits for domestic wastewater discharges.

B. Facts in Support

To derive the proposed standards for BETX, zinc, nickel, and weak acid dissociable cyanide, the Agency made a concerted effort to find all pertinent toxicity information. The Agency did not solely rely on USEPA criteria documents or previous rulemakings, but rather followed a comprehensive procedure to derive protective standards tailored to Illinois conditions. The conversion of total metals to dissolved form is based on the application of factors calculated by USEPA to create toxicity-based standards, rather than on any new toxicity data.

The Agency, in general, followed the procedures laid down by USEPA in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, 1985 (NTIS PB85-227049) (USEPA 1985a) (“Guidelines”) (*See Exhibit E*). The

USEPA and other states have routinely used these guidelines to develop water quality standards. The Illinois EPA used the same Guidelines in the development of procedures in 35 Ill. Adm. Code 302, Subparts E and F. In this proposal, the Agency derived water quality standards using Subpart E procedures as it has more recently undergone the review and scrutiny of Board rulemaking. If the quality of the databases available does not allow use of the Tier I procedures for all substances, Subpart E procedures are more preferable. Further, Subpart E procedures are newer and more up-to-date than Subpart F procedures.

In the USEPA's Tier I method, the minimum database for either the acute or chronic criterion consists of toxicity data for representatives of eight (8) different groups of animals. Acute and chronic criteria are then derived that are protective of 95% of the target aquatic community. The derivation process using the Guidelines involves the following steps:

- 1) Data acquisition The data for laboratory toxicity tests is obtained from the USEPA aquatic toxicity database AQUIRE, National Ambient Water Quality Criteria Documents, and original literature obtained by the Agency. To search AQUIRE, it was necessary to use more than one Chemical Abstracts Service ("CAS") number for the metals and for total xylenes. The cut-off date for data acquisition was summer of 2000.
- 2) Literature acquisition The Agency obtained original literature such as journal articles, reports and books to verify values reported in databases. The Agency made its best efforts to obtain as many original papers as possible containing the data to verify the toxicity values, and to get ancillary information such as hardness that is necessary for the calculation of the metals criteria. Also, some data may have been obtained using nonstandard conditions such as low or high pH, turbid water or feeding in an acute experiment. This information was necessary to decide whether to accept the results of a given study.
- 3) Analysis and tabulation An important aspect of data analysis was to determine whether

necessary taxa are in the database. The Agency used only data from genera found in the Midwest.

- 4) Calculations The Agency used the Guidelines procedures to determine Species Mean Acute Value (“SMAVs”) and Species Mean Chronic Value (“SMCV”), Genus Mean Acute Chronic Value (“GMACVs”), and criteria calculations.

Exhibit F contains more details on the standards’ derivation process. The document provides detailed discussion on the basic and environmental chemistry, mechanism of toxicity, environmental levels and analytical methods associated with the proposed amendments. Exhibit F also includes information on the water quality criteria derivation from USEPA in 1980 and following years; a part of the database used to calculate the standard; the GLI standards; the existing Illinois water quality standards; and the proposed standards.

C. Public Participation

In September 2000, the Illinois EPA sent the draft proposal to several organizations for their comments and suggestions. The recipients included the Illinois Environmental Regulatory Group, the Chemical Industry Council, the Illinois Association of Wastewater Agencies, the U.S. Environmental Protection Agency, the Illinois Natural History Survey, the Environmental Law & Policy Center, the Illinois EPA Office of Chemical Safety, the Sierra Club, and the Metropolitan Water Reclamation District of Greater Chicago (“MWRDGC”). The MWRDGC and Sierra Club submitted their comments to the Illinois EPA. Some of their suggestions and comments are now part of the today’s proposal. The Illinois EPA is grateful to all the participants for their assistance.

D. Technical Feasibility and Economic Justification

This proposal places no new regulatory requirements under the State's water quality standards. It simply revises and updates the existing standards based on the new scientific data and information. The regulated community has been complying with the proposed amendments, the proposed BTEX standards, via water quality criteria. Further, states are required to revise and update their water quality standards once every three years. This proposal fulfills that federal requirement by revising the existing standards; therefore, the economic impact on the regulated community is minimal.

IV. Synopsis of Testimony

During the Board's proceedings in this matter, the Illinois EPA will present two witnesses in support of the proposed rulemaking: Bob Mosher is the Supervisor of the Water Quality Standards Unit within the Division of Water Pollution Control. His duties include: the development of water quality standards and the implementation of these standards in the Agency programs particularly the NPDES permit process. Mr. Mosher has been with the Agency for nearly 16 years. He is an aquatic biologist by training. Mr. Mosher will testify concerning the implementation of the proposed standards.

Clark Olson is a toxicologist with the Water Quality Standards Unit. He has been with the Agency for 22 years. His duties include the derivation of water quality criteria for the protection of aquatic life, human health, and wildlife based on the Board narrative standards prohibiting toxic effects of substances in General Use and Lake Michigan Basin waters. Mr. Olson will testify concerning the development of the proposed standards.

V. Supporting Documents

33 USC § 1313

Exhibit A: USEPA 1996: U.S. Environmental Protection Agency (USEPA) 1996. The Metals Translator: Guidance for Calculating A Total Recoverable Permit Limit From A Dissolved Criterion. EPA 823-B-96-007.

Exhibit B: USEPA 1987: U.S. Environmental Protection Agency (USEPA) 1987. Ambient Water Quality Criteria for Zinc – 1987. EPA-440/5-87-003.

Exhibit C: USEPA 1986: U.S. Environmental Protection Agency (USEPA) 1986. Ambient Water Quality Criteria for Nickel – 1986. EPA-440/5-86-004.

Exhibit D: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Final Water Quality Guidance for the Great Lakes System; Final Rule, Federal Register, Vol. 60, No. 56, March 23, 1995: 15391-15392.

Exhibit E: USEPA 1985a: U.S. Environmental Protection Agency (USEPA) 1985. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. PB85-227049.

Exhibit F: Overview of Standards' Derivation Process. Illinois EPA.

Exhibit G: Proposed Water Quality Standards Calculated at a Typical Hardness Value of 250 mg/L (Where Applicable)

Exhibit H: Glossary

Exhibit I: USEPA 1980a: U.S. Environmental Protection Agency (USEPA) 1980. Ambient Water Quality Criteria for Benzene. EPA 440/5-80-018.

Exhibit J: Ambient Water Quality Criteria for Benzene. Illinois EPA.

Exhibit K: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of

Human Health. EPA-820-B-95-006.

Exhibit L: USEPA 1980b: U.S. Environmental Protection Agency (USEPA) 1980. Ambient Water Quality Criteria for Ethylbenzene. EPA 440/5-80-048.

Exhibit M: Ambient Water Quality Criteria for Ethyl Benzene. Illinois EPA.

Exhibit N: USEPA 1980c: U.S. Environmental Protection Agency (USEPA) 1980. Ambient Water Quality Criteria for Toluene. EPA 440/5-80-075.

Exhibit O: Ambient Water Quality Criteria for Toluene. Illinois EPA.

Exhibit P: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Human Health. EPA-820-B-95-006.

Exhibit Q: Water Quality Criteria for Xylene(s). Illinois EPA.

Exhibit R: USEPA 1999: U.S. Environmental Protection Agency (USEPA) 1999. National Recommended Water Quality Criteria – Correction. EPA 882-Z-99-001.

Exhibit S: Ambient Water Quality Criteria for Zinc. Illinois EPA.

Exhibit T: USEPA 1980: U.S. Environmental Protection Agency (USEPA) 1980. Ambient Water Quality Criteria for Zinc. EPA 440/5-80-079.

Exhibit U: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-95-004.

Exhibit V: Ambient Water Quality Criteria for Nickel. Illinois EPA.

- Exhibit W: USEPA 1980: U.S. Environmental Protection Agency (USEPA) 1980. Ambient Water Quality Criteria for Nickel. EPA 440/5-80-060.
- Exhibit X: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-95-004.
- Exhibit :Y USEPA 1985b: U.S. Environmental Protection Agency (USEPA) 1985. Ambient Water Quality Criteria for Cyanide-1984. EPA 440/5-84-028.
- Exhibit Z: Water Quality Criteria for Cyanide. Illinois EPA.
- Exhibit AA: USEPA 1995: U.S. Environmental Protection Agency (USEPA) 1995. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-95-004.
- Exhibit BB: USEPA 1993: U.S. Environmental Protection Agency (USEPA); 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. PB94-118544.
- Exhibit CC: APHA. American Public Health Association. 1998. Standard Methods for the Examination of Water and Wastewater. 20th Edition. Washington, D.C.
- Exhibit DD: Metcalf & Eddy 1991. Metcalf & Eddy, Inc. 1991. Wastewater Engineering: Treatment Disposal Reuse. 3rd Edition. Attachment 1 & 2. McGraw-Hill. New York.
- Exhibit EE: Metcalf & Eddy 1991. Metcalf & Eddy, Inc. 1991. Wastewater Engineering: Treatment Disposal Reuse. 3rd Edition, p.76. McGraw-Hill. New York.

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