BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

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	)	

NOTICE OF FILING

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Attached Service List

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board the Illinois Environmental Protection Agency's **COMMENTS AND WRITTEN TESTIMONY OF ROBERT MOSHER**, a copy of which is herewith served upon you.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By:_____

Sanjay K Sofat
Assistant Counsel
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Dated: July 10, 2002
Illinois Environmental Protection Agency
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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

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

AGENCY'S COMEMNTS

THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (the "Agency") respectfully submits its comments to the First Notice in the Illinois Pollution Control Board's (the "Board") R02-11 rulemaking proceeding. The Agency appreciates the opportunity to participate in this important rulemaking proceeding. The Agency is thankful to all the parties and participants for their input.

The Board has addressed in the First Notice for R02-11, many of the issues raised during this proceeding by various stakeholders. The Agency strongly supports the Board's findings on all of the issues except, the finding that the proposed cyanide standard is not justified. The Board raised several issues in support of this finding. Understanding the importance of these issues, the Agency considers the July 25, 2002 hearing as an opportunity to re-address the issues. In support, the Agency is filing Robert Mosher's testimony that provides extensive discussion on the reasoning behind the Agency's proposed cyanide standard. The Agency believes this testimony would help to clarify some of the issues raised by the Board and other stakeholders.

TESTIMONY OF ROBERT MOSHER

QUALIFICATIONS/INTRODUCTION

My name is Robert Mosher and I am the Manager of the Water Quality Standards Section within the Division of Water Pollution Control at the Illinois Environmental Protection Agency ("Illinois EPA" or "Agency"). I have been with the Illinois EPA in excess of 16 years. Almost all of that time has been spent in my current capacity where my primary responsibility is the development and implementation of water quality standards. I have a Masters Degree in Zoology from Eastern Illinois University where I specialized in stream ecology. My testimony will cover a detailed discussion on the reasoning behind the Agency's proposed cyanide standard and response to the issues raised in the Board's June 20, 2002, opinion and order.

THE AGENCY"S REASONING BEHIND CYANIDE STANDARD

The Agency regrets the Board's decision declining to change General Use water quality standards for cyanide. A simple but important mistake on our part in 1988 (R88-21, "Toxics Control" rulemaking) caused an improperly stringent standard to be adopted at that time. Our explanation for the correction of that standard at recent hearing may have overly stressed that point and may not have provided enough necessary background for the Board and others to understand and appreciate the need for the change in the cyanide standard. We possibly took for granted that the environmental groups and the Illinois Department of Natural Resources (IDNR), two groups that commented unfavorably on our proposal, were aware of the complexity of cyanide standards and a recent site-specific regulation for cyanide that essentially parallels the Agency's proposed changes. To correct this, we offer the following more thorough history and explanation of the General Use cyanide standard in Illinois.

First, we need to explain some unique aspects of cyanide and how these influence the water quality standard that appears in the regulations. In the laboratory, when cyanide is dissolved in water for purposes of conducting a toxicity test on an aquatic organism, a pure cyanide salt such as potassium cyanide, and relatively pure laboratory water are utilized. The resulting form of cyanide present in the test solution is largely free cyanide. Free cyanide is very toxic to test organisms as evidenced by the low reported toxic concentrations. This is because free cyanide is the most available form to organisms; the cyanide is not bound to other substances and thereby restricted from entry into the organism. The presence of other substances in the water, especially iron, other metals and organic substances will cause the sorption and complexation of free cyanide. A good explanation of the speciation of cyanide is given in the first few pages of the National Criteria Document, provided in the Agency's original proposal as Exhibit Y. Water from lakes and streams will undoubtedly have many of the substances with which free cyanide will bind to in abundance. Environmental samples that contain cyanide will have other less toxic or nontoxic species of cyanide present in addition to the potential for free cyanide.

Given that the toxicity studies forming the basis of the national criteria and our proposed state standards are performed with free cyanide, it would be logical to adopt the water quality standards as this defined chemical species. Unfortunately, the analytical measurement of free cyanide is not practicable. No approved USEPA test method exists for free cyanide. At the other end of the spectrum is an analytical test for total cyanide. This test uses a strong acid to dissociate cyanide from other molecules that it is bound to. Many of these cyanide species are stable in the natural environment and pose no threat to aquatic life, but when subjected to the acid treatment for the analytical test they are solublized and measured. The National Criteria Document warns that the "criteria may be overly protective when based on total cyanide". In other words, a large degree of conservatism, i.e., additional protection, is introduced when total cyanide measurements from the

environment are compared to water quality criteria based on free cyanide exposure of aquatic life in the laboratory. We recognized this problem in 1988 when the Agency recommended that a cyanide species (as defined by method of analysis) other than total cyanide should be used to regulate this substance.

Weak acid dissociable cyanide (Standard Methods 4500 CN – I) is an analytic method that uses a weak acid instead of a stronger acid to solubilize cyanide in an environmental sample. The weak acid does not release the more strongly bound forms. Thus, this analytical method measures only the more weakly bound forms along with free cyanide. The Agency chose this method, as did other states, to define the standard. Since we cannot measure the free cyanide that would most faithfully address the toxicity tests, we decided that total cyanide would be much too conservative and so weak acid dissociable cyanide seemed the best possible choice. However, it is known that even the weak acid dissociable test will measure bound forms of cyanide that do not resemble the free cyanide on which the standard is based. The Agency proposal is therefore automatically more conservative than the National Criteria based on the free cyanide toxicity tests.

Dr. Anderson of IDNR has offered commentary and several objections to the Agency's proposed cyanide standards that do not seem well founded and to which we disagree. He refers to the existing and proposed acute and chronic standards as "weak acidic". The Agency is not aware of such terminology. One familiar with cyanide chemistry would refer to weak acid dissociable cyanide by its correct name we would think. Later in his comments, Dr. Anderson seems to refer to cyanide as a metal when he says that "Unionids do, however, tend to be more sensitive than fish species to pollutants generally, and other metals specifically". Of course, cyanide is not a metal but rather a compound of carbon and nitrogen.

Dr. Anderson makes two main points in his comments. First, that the proposed cyanide standard lacks an adequate margin of safety and second, that the standard is not valid because it was

derived from a database lacking information on unionid mussels. The Agency's pre-filed and hearing testimony explained how we conformed to USEPA methodology when deriving the proposed standards. Removing non-native cold-water species is perfectly valid using the USEPA guidance. We have now explained how the weak acid dissociable cyanide form regulated has added a degree of conservatism. Dr. Anderson's comments read as though he thinks that toxicity tests were conducted with the same cyanide species as defines the standards. This we believe was a critical mistake in Dr. Anderson's testimony to the Board.

Much of Dr. Anderson's comment revolves around cool and cold-water species. Illinois has a very clear and distinct division of water quality standards for waters that do and do not support cold-water species. Lake Michigan standards protect cold water species and General Use standards do not automatically presume to do so. The Agency proposal does not change the weak acid cyanide standard for Lake Michigan. It is the appropriate standard for that body of water. Cold-water species such as trout and salmon are not native to waters in Illinois other than Lake Michigan. Earlier research by the Agency found no references in the early fisheries literature that documents trout in Illinois streams. Whatever trout live in Illinois streams now were put there by IDNR or others wanting to establish a "put and take" fishery. Dr. Anderson gives the known instances when trout are known to have reproduced in Illinois. Two instances of reproduction (Dr. Anderson does not give testimony as to the survival of the young spawned) in our state does not prove that viable trout populations are normal or expected in Illinois. If one wanted to make that case, several water quality standards should be changed to protect trout and the Agency, instead of correcting a single case where trout and salmon data were mistakenly included in a General Use standard, should instead be suggesting that this data be factored into all other General Use standards. This is a ridiculous concept and would rein havoc on water quality management. The Board has correctly ruled many times in the past that cold-water standards (those based on data form cold-water species)

are not appropriate in General Use waters. Where trout are stocked and a new water quality issue arises, e.g., a new discharger proposes to discharge, the antidegradation standard has been designed to anticipate and rectify any problems posed by unique communities of aquatic organisms including trout.

Dr. Anderson erred in stating that the cyanide database lacks cool-water species. At least one "cool-water" species is present in the acute database, the yellow perch. The notion that cold-water species must be used in standards derivation to protect cool-water species is ludicrous. The trout and salmon belong to a totally different family of fishes with none of its members tolerating cool or warm water. Cool water species mentioned by Dr. Anderson such as the blackchin shiner and Iowa darter have warm water relatives existing everywhere in Illinois that belong to the same genus, let alone family. Cool-water species therefore resemble warm-water species much more than they do cold-water species.

Dr. Anderson takes special note of one of the scientific papers cited by the National Criteria Document, Kimball, et. al., 1978, which he refers to as a "troubling study". He notes ominously that USEPA "rejected the use of this data", but "they clearly felt compelled to cite the study". He relates that the study purportedly shows that bluegills are prevented from spawning by cyanide concentrations as low as 5.4 ug/L and apparently thinks that this piece of information should have been factored into the standard. USEPA wisely rejected this data because the study did not live up to basic tests of scientific rigor. When one reads the Kimball paper it is immediately obvious that the bluegill spawning study lacks defined concentrations of exposure for the threshold of toxicity. The study also found that the highest concentration of cyanide tested allowed some bluegill spawning but that the lowest concentration did not. Such data does not meet the specifications of USEPA's "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Life and Their Uses". Such data are always rejected by USEPA (although each incidence of

rejected data is mentioned in the Criteria Document); the study is indeed "troubling". A different test with bluegill and cyanide is contained in the same paper and this one was accepted for use in the National Criteria derivation, providing the most sensitive chronic endpoint for any warm-water species, 13.57 ug/L. Our proposed standard of 11 ug/L is within this lower boundary even if we were proposing to regulate free cyanide. What Dr. Anderson has apparently failed to understand, and which is all important to the question of margin of safety, is that we are proposing to continue to regulate weak acid dissociable cyanide.

Dr. Anderson's other main point concerning mussel data is equally without merit. He notes that no unionid mussel species has been tested for cyanide sensitivity. He is correct and in fact, most substances have not been so tested. The toxicity testing of mussels is a new and developing science. As explained in this rulemaking and in the ammonia standards rulemaking (R01-19), controversy exists whether the few existing mussel tests are legitimate. There are basic questions of science to be answered. USEPA Region 5 management has assured the Agency that mussel data should not enter the derivation process as a driving factor until the controversies are resolved and reasonable experts agree that mussel data is legitimate. We agree with Dr. Anderson that mussels are important and that they may even be more sensitive to some pollutants than other organisms. However, to reject a standard because no mussel data are available is naïve and unrealistic. Virtually all existing Board standards were developed without mussel data. Again, subscribing to the logic of Dr. Anderson and the environmental groups would force the Board to abandon all these existing standards with nothing available to replace them with. As stated at hearing, the IEPA will monitor the state of mussel toxicity testing and when methodologies are standardized for these tests and when studies using standardized methods are published, we will re-evaluate existing standards. This approach is one of the basic tenants of the triennial review of standards dictated by the Clean Water Act.

The Agency would like to conclude its supplemental justification for its original proposed cyanide standards with the following reasons in support of Board adoption. These were probably at least hinted at during the hearings or in pre-filed testimony, but regardless, a firm statement for each reason is certainly necessary at this time.

1. The recalculation of the cyanide standards by eliminating some data was done under the accepted procedures found in the USEPA's "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Life and Their Uses". It is a legitimate and common procedure for states to delete cold-water species from the database and derive warm-water protective standards using this universally employed method. Other states have conducted nearly identical derivations. We cite the free cyanide standard for Ohio, applied to the warm-water streams of that state. The acute Ohio standard is 46 ug/L and the chronic is 12 ug/L.
2. The Board adopted a site-specific regulation at 35 IAC 303.444 that parallels the Agency's proposal to change the General Use standard. The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) was the proponent of this site-specific standard. This standard covers four General Use waters, Salt Creek, Higgins Creek, the West Branch DuPage River and the DesPlaines River. These rivers constitute a significant part of the drainage of Northeastern Illinois. The reasons that MWRDGC gave for the change were two-fold. First, removal of the cold-water species data allows a warm-water standard protective of the species found in the listed waters. Second, MWRDGC found that analytical problems exist with the weak acid dissociable cyanide test at levels below 10 ug/L. Interferences were present that resulted in false detections of weak acid dissociable cyanide. Because of the analytical problems, MWRDGC was not always able to show compliance with the 5.2 ug/L chronic standard when it was sure that no significant amount of cyanide

was present. These difficulties exist everywhere else in the state as well and constitute one motive behind the Agency's proposal to update the standard. While we have testified that there are few if any dischargers of cyanide that would realize relief from the standard change because they cannot meet the existing standards, there are many dischargers that have trouble measuring weak acid dissociable cyanide down to 5.2 ug/L. The usually reported laboratory detection limit is 10 ug/L. Laboratories have indicated that they are not comfortable in reporting down to the presently necessary 5 ug/L. We believe that this is due to the same reasons that MWRDGC received relief in 1996. At the time of that site-specific rulemaking, the Agency stated that it believed that the requested site-specific relief was appropriate for the remainder of General Use waters. Unfortunately, it has taken us these many years to propose such a statewide change. What the Board found appropriate in 303.444 should also be found appropriate for the other General Use waters. We note that the reason our proposal raises the chronic standard from 10 to 11 ug/L stems from additional toxicity studies being found since 1996.

3. We believe that the changes in General Use water quality standards are federally approvable. We expect USEPA Region 5 to approve these standards since they have approved the Ohio standards, which are less stringent than ours.

4. The proposed weak acid dissociable cyanide standards fulfill the triennial review of standards requirement of the Clean Water Act. We know of no provision in the Act that prohibits a state from finding that a given standard should be raised. While generally, new data, or re-evaluation of previously known data, result in more stringent standards, this is not always the case and it must not be perceived that this outcome is expected from such a review. (Another case in point would be the current ammonia rulemaking. National criteria for ammonia are in many cases, depending on pH and temperature conditions, less stringent

than the existing Board standard. Toxicity data for cold-water species was removed from the database to create warm-water ammonia criteria in the National Criteria Document and that this concept is being applied to General Use waters in Illinois). The Agency took the valid data regarding the effects of cyanide on aquatic life and generated a warm-water standard. It is totally appropriate to heed what the data tell us and raise the standard, especially in light of the problems with interferences when attempts are made to assess attainment with the lower standard. What matters most is that water quality standards are scientifically valid, not whether they become more or less stringent.

The Agency would like to express its appreciation to the Board for the opportunity to participate in this proceeding. As set forth more full above, the Agency urges the Board to adopt the Agency's proposal including proposed cyanide standard in the light of Bob Mosher's supplement testimony.

Respectfully Submitted

ILLINOIS ENVIRONMENTALPROTECTION AGENCY

By:_____

Sanjay K Sofat
Assistant Counsel
Division of Legal Counsel

DATED: July 10, 2002

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STATE OF ILLINOIS)
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PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached **AGENCY'S COMMENTS AND ROBERT MOSHER'S TESTIMONY** upon the person to whom it is directed, by placing a copy in an envelope addressed to:

Dorothy Gunn, Clerk
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Attached Service List
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and mailing it from Springfield, Illinois on July 10, 2002, with sufficient postage affixed as indicated above.

"OFFICIAL SEAL"
STEPHEN C. EWART
Notary Public, State of Illinois
My Commission Expires 11/16/02

Nancy J. Lamport

SUBSCRIBED AND SWORN TO BEFORE ME

this day of July 10, 2002.

Stephen C. Ewart
Notary Public

R02-11
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July 10, 2002

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