

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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AUG 18 2005

IN THE MATTER OF:)
)
REVISIONS TO RADIUM WATER QUALITY)
STANDARDS: PROPOSED NEW 35 ILL. ADM.)
CODE 302.307 AND AMENDMENTS TO)
35 ILL. ADM. CODE 302.307 AND 302.525)

STATE OF ILLINOIS
Pollution Control Board
R 0-21
(Rulemaking - Water)

PC#50

NOTICE

TO: Dorothy Gunn, Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601

Amy Antonioli, Hearing Officer
Illinois Pollution Control Board
James R. Thompson Center
100 W. Randolph Street, Suite 11-500
Chicago, Illinois 60601

SEE ATTACHED SERVICE LIST

PLEASE TAKE NOTICE that I have filed with the Office of the Pollution Control Board the SECOND FIRST NOTICE COMMENTS OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY on behalf of the Illinois Environmental Protection Agency, a copy of which is herewith served upon you.

Date: August 15, 2005

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: *Deborah J. Williams*
Deborah J. Williams
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THIS FILING IS SUBMITTED ON
RECYCLED PAPER

AUG 18 2005

STATE OF ILLINOIS
Pollution Control Board

REVISIONS TO RADIUM WATER)
QUALITY STANDARDS: PROPOSED)
NEW 35 ILL.ADM.CODE 302.307)
AND AMENDMENTS TO 35 ILL.ADM.)
CODE 302.207 AND 302.525)

R04-021
Rulemaking – Water

**SECOND-FIRST NOTICE COMMENTS OF THE ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY**

NOW COMES the ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
("Illinois EPA" or "Agency"), by and through one of its attorneys, Deborah J. Williams,
and hereby respectfully submits to the Illinois Pollution Control Board ("Board") its
Second First Notice Comments in the above-captioned regulatory proceeding. In support
thereof, the Illinois EPA states as follows:

BACKGROUND AND INTRODUCTION

The current General Use water quality standard for radium 226 (contained in 35
Ill. Adm. Code 302.207) is 1 picocurie per liter ("pCi/L") and was adopted by the Board
in the initial set of Board regulations in 1972. *See*, R71-14. There is no existing standard
for radium 228. Under Section 303(c) of the Clean Water Act, the Illinois EPA has the
obligation to no less than every three years conduct reviews of its water quality standards
and update those standards where needed. *See*, 33 U.S.C. 1313(c). As part of that
process, the Agency filed a proposal to update the water quality standards for Radium on
January 13, 2004. The Illinois EPA proposed eliminating the General Use and Lake
Michigan Basin radium 226 water quality standards and replacing them with a combined
radium 226 and 228 water quality standard of 5 pCi/L in the Board's Public and Food

Processing Water Supply standards, found in Subpart C of Subtitle C of the Board's Water Quality Standards Regulations. *See*, 35 Ill. Adm. Code 302.301-302.306.

The Board issued a First Notice Opinion on July 8, 2004 that contained language identical to the Agency's proposal that was published in the Illinois Register on August 6, 2004. A total of four hearings over five separate days have been held on this matter and after extensive post-hearing comments, the Board issued an opinion on April 7, 2005 in which it decided to withdraw the First Notice proposal and issue a Second First Notice proposal, which was published in the Illinois Register on April 29, 2005. Following a Motion by the City of Joliet for an extension of the comment period, the Board set a deadline of August 15, 2005 for public comments on its Second First Notice proposal.

The Board's proposal would replace the General Use Water quality standard of 1 pCi/L radium 226 with a combined radium 226 and 228 standard of 3.75 pCi/L. The General Use standard would be 30 pCi/L for 1 mile downstream from the discharge point of a publicly owned treatment works ("POTW") receiving discharges from public drinking water supplies using high radium sourcewater (greater than 3.75 pCi/L). No Public and Food Processing Water Supply Standard is found in the Board's proposal. The Board solicited comments from the public on its Second First Notice proposal and particularly asked for input from commenters on whether its proposal will achieve the stated goal of giving some relief to the regulated community in the radium belt of Northern Illinois.

COMMENTS ON BOARD'S SECOND FIRST NOTICE PROPOSAL

The Illinois EPA bases these comments on three assumptions about the underlying goals of the Board's Second First Notice proposal. First, that the Board

intends for the proposal to assure protection of the most sensitive use of the waters of the State. In this case, the most sensitive use is assumed by a consensus of the stakeholder's to this proceeding to be reproductive impacts on riparian mammals from long term exposure to radium in the rivers and streams they use for habitat. Second, the Board has stated a goal of avoiding the imposition of an unreasonable hardship on the POTWs in the radium belt of Northern Illinois that receive discharges from public water supply systems that must treat groundwater to achieve compliance with U.S. EPA's maximum contaminant level ("MCL") for radium 226 and 228. It is assumed that the types of hardships the Board is attempting to avoid are either requiring these communities to cease use of radium containing groundwater for drinking or requiring the use of additional add on treatment technologies at individual POTWs. Finally, the Illinois EPA assumes the Board also intends to protect downstream public water supply systems using surface water as source water for drinking from future violations of the MCL.

The Agency's comments will attempt to address the Board's goals and expand on some issues raised by Region V of the United States Environmental Protection Agency ("U.S. EPA Region V") in their comments filed on June 14, 2005. The Agency still stands behind the proposal it filed with the Board in January 2004 and believes the Board is mistaken in its reliance in its Second First Notice proposal on the technical information submitted by WRT Environmental. These comments will not repeat the Agency's Post-Hearing comments or hearing testimony, but will instead attempt to advise the Board of the best way to achieve its goals within the framework established in its April 2005 Opinion and Order and the requirements of the Clean Water Act. These comments will also identify one typographical error in the Board's Second First Notice Opinion.

Discussion of Comments Filed by U.S. EPA Region V

U.S. EPA raised several key points in their brief comments to the Board. The Illinois EPA agrees with most of these points and would like to clarify and expand on one of them. U.S. EPA points out that it has “no national criteria recommendations for radium to protect aquatic life or wildlife, and there are insufficient data to support derivation of water quality criteria for either of these endpoints using USEPA methods.” Public Comment 41 at 1. These comments support the consistent position taken by the Agency throughout this proceeding that studies do not currently exist which meet U.S. EPA’s guidelines for development of Water Quality Standards. U.S. EPA’s comments also indicate that a standard of 3.75 pCi/L would be approvable, but they do not see support in the record for the dual 3.75/30 pCi/L General Use and Lake Michigan radium standard proposed by the Board. In fact, the implication from U.S. EPA’s comments is that in all likelihood a General Use standard of 30 pCi/L would be approvable as well.¹ U.S. EPA appears primarily concerned about how to reconcile the two separate standards proposed by the Board, rather than the numbers themselves.

The Board states that the 3.75 pCi/L standard proposed for all General Use waters beyond one mile downstream from community sewage treatment plants and Lake Michigan is based on a U.S. Department of Energy (“D.O.E.”) model and is purported to be the concentration necessary for protection of terrestrial wildlife inhabiting riparian zones, i.e., habitat consisting of streams and the dry land immediately bordering streams. Illinois EPA gave testimony refuting the appropriateness of the 3.75 pCi/L value and the use of the D.O.E. model in developing a water quality standard during the hearings and in

¹ As indicated by the Agency at hearing, U.S. EPA Region V had also expressed informal verbal approval of the Agency’s initial regulatory proposal to eliminate a General Use water quality standard for radium and replace it with a Public and Food Processing Water Supply standard.

its post-hearing comments. The Illinois EPA still strongly opposes the use of the D.O.E. model for a purpose so far removed from the one it was developed to address. However, for these Second First Notice comments, the Illinois EPA will offer the Board constructive suggestions for improvement to the proposed General Use water quality standard.

General Use Radium Water Quality Standard as a Long Term Average

The one issue upon which the parties appeared to achieve consensus at the hearings in this matter was that the available evidence shows that mammals living near and obtaining their food source from streams (riparian mammals; e.g., musk rats, river otters) are predicted to be the category of organisms most susceptible to harm. This harm comes from cumulative exposure to radioactivity. The longer the exposure of the mammals to radium in the stream water, the greater the chances for adverse effects on reproduction over the individual's lifetime.

Given the newly established mode of adverse impact for radium, it is not appropriate to change the value of the standard (or to leave the standard as is) without changing the exposure period under which the standard is applied. Under the existing standard, and in the Board's proposal, a certain concentration of radium, either 1 pCi/L radium 226 or 3.75 pCi/L radium 226 and 228 combined, must never be exceeded at any time. Under these instantaneously applied standards, dischargers would be regulated using 7Q10 stream flow conditions (the average minimum seven day low flow which is predicted to occur once in ten years) as the basis for calculating the mixing that may be allowed for dischargers with high radium sourcewater. In addition, POTWs that have zero 7Q10 stream flows would not be entitled to a mixing zone under an instantaneously

applied General Use standard pursuant to Section 302.102(b)(8) of the Board's mixing zone regulations. *See*, 35 Ill. Adm. Code 302.102(b)(8). The Board recognized this problem and the hardship it would create for POTWs and attempted to address it through the use of an alternative standard for 1 mile below the discharge point from impacted POTWs. As stated in the Second First Notice Opinion:

The Board considered a number of options for providing relief to POTWs, including a blanket exemption from general use radium water quality standards, setting effluent limits, and specifying mixing zones in accordance with 35 Ill. Adm. Code 302.102. However, since the noncompliance issues are mostly associated with POTWs discharging into low flow streams, the Board finds a Section 302.102 mixing zone would not address POTW concerns. Instead, the Board finds that specifying a zone of mixing allowing a radium concentration above the proposed general use standard better addresses the POTWs' concerns. ... While the Board presently believes that a 1-mile segment of the stream should provide an adequate mixing zone for POTW discharges to comply with the proposed general use standard of 3.75 pCi/L, the Board invites comments from the participants on this provision.

R04-21, Second First Notice Opinion, Slip. Op. at 25. The Illinois EPA does not believe the Board's proposal succeeds in the goal of providing relief to POTW dischargers to low flow streams. There is no evidence in the Record to suggest that radium would degrade over the distance of 1-mile below the POTW discharge. The Agency also believes most POTWs that would violate an instantaneous standard of 3.75 pCi/L at its discharge point to a zero 7Q10 waterbody would rarely achieve sufficient dilution of the effluent 1-mile downstream to achieve compliance with the instantaneous standard. In response to the Board's concerns, the Illinois EPA recommends that U.S. EPA's suggestion of utilization of long-term averaging for the radium water quality standard which incorporates the use of long term flow values in developing mixing zones would more closely achieve the Board's stated goals.

The implementation method used for the majority of the Board's acute and chronic water quality standards relies on use of 7Q10 values and was developed to address substances that have a relatively short-term critical exposure period – days or weeks of exposure leading to adverse impacts rather than years of exposure leading to these impacts. The Illinois EPA agrees with U.S. EPA that a standard applied with a short exposure period is inappropriate given the nature of the substance being regulated. U.S. EPA points to the example of the implementation of wildlife protection water quality standards developed for the Great Lakes Water Quality Initiative (GLI). See, 35 Ill. Adm. Code 302.Subpart F (Lake Michigan Basin Water Quality Standards). In Subtitle E of the Board's regulations bioaccumulative substances such as PCBs or DDT are regulated based on concentrations present during 90Q10 or higher stream flow conditions (the average minimum 90 day low flow which is predicted to occur once every 10 years).² Using this flow condition acknowledges that discharged concentrations of the substance will be diluted much of the time due to higher than 90Q10 conditions usually being present in the waterbody. The 90Q10 stream flow values will be higher than 7Q10 values and many streams with a 7Q10 flow value of zero would have a higher than zero 90Q10 value. The fish that affected wildlife (eagles, otters, etc.) eat will therefore not bio-accumulate the substance at the highest rate all the time, therefore fish flesh concentrations will remain acceptably low, and the wildlife species are protected. Use of

² The Illinois State Water Survey's website explains the concept of 7Q10 as follows: "A 7-day low flow for a stream is the average flow measured during the 7 consecutive days of lowest flow during any given year. The 7-day 10-year low flow (Q7,10) is a statistical estimate of the lowest average flow that would be experienced during a consecutive 7-day period with an average recurrence interval of ten years. Because it is estimated to recur on average only once in 10 years it is usually an indicator of low flow conditions during drought." Simply substituting 90 for 7 would explain the meaning of the term 90Q10.

the more conservative 7Q10 flow values in calculating permit limits was found by the Board to be inappropriate for the type of impact being regulated for these parameters.

There are at least two other examples in the Board's regulations that utilize a flow value other than 7Q10. One example is the Human Nonthreshold Criterion of Subpart F of Subtitle C of the Board's water quality standards regulations which uses harmonic mean flow values. Another example is an annual average used in the Human Health Standard which is defined in 35 Ill. Adm. Code 302.208(c) and is used for mercury and benzene:

The human health standard (HHS) . . . shall not be exceeded when the stream flow is at or above the harmonic mean flow pursuant to Section 302.658 nor shall an annual average, based on at least eight samples, collected in a manner representative of the sampling period, exceed the HHS except as provided in subsection (d).

Because radium affects wildlife primarily through simple exposure it is even more important to establish a long term average under the radium water quality standard than for the other substances regulated using long term average. Radium can be contrasted with the PCBs and DDT-type chemicals regulated by the GLI wildlife protection standards, mercury or benzene regulated under the HHS or substances regulated under the Human Nonthreshold Criteria in Subpart F that impact organisms only through bioaccumulation. For this reason, it makes even less sense to regulate radium based on instantaneous (not-to-be-exceeded) standards. A standard that insists that radium never exceed 3.75 pCi/L does not indicate whether undesirable exposure has occurred or not. Therefore, the Illinois EPA is recommending that the Board adopt General Use and Lake Michigan Basin radium water quality standards that are based on an annual average concentration in the water body. This means that a stream concentration above 3.75

pCi/L is allowable as long as at other times the concentration is lower resulting in an annual average meeting the standard.

One additional justification for use of a long term average is the Board's reliance on the biota dose assessment of the DOE model in establishing the General Use water quality standard at 3.75 pCi/L combined radium 226 and 228. As discussed in testimony at the Board hearings, this screening model was designed to address contaminated sites and detect a screening level at which additional tests and studies to determine potential impacts to riparian wildlife should be conducted. The potential impacts being protected for in this model are reproductive effects on riparian mammals that occur over a lifetime of exposure to radium concentrations in their environment. The exposure period contemplated by the D.O.E. model is consistent with the annual average exposure period recommended by the Illinois EPA. To attempt to use parts of DOE's model without allowing for the use of averaging over a period of time adds an unjustifiable level of conservatism upon an already conservative screening tool.

The annual average of stream flow is a reasonable and easily calculated statistic for establishing a meaningful implementation scenario. The U.S. Geological Survey provides annual average flow values and, where necessary, it is believed that these values can also be derived based on watershed and basin information. Communities discharging radium to a receiving stream would receive radium permit limits (if a reasonable potential to exceed the radium water quality standard in the stream existed) based on the dilution provided to their sewage treatment plant effluent by the average annual flow of the receiving stream. This exposure period and implementation strategy will protect riparian mammals, while simultaneously minimizing the potential for economic hardship to

communities with radium in their water supply. Under this implementation method, discharges of radium-bearing effluent to lakes, a condition now not known to exist, would be discouraged because lakes usually have no flow and thus no dilution would be afforded. The Illinois EPA believes that an annual average is the most appropriate tool available for the regulation of radium to protect the riparian mammal use of the General Use and Lake Michigan waterbodies in the waters of the State of Illinois. As will be explained below, it is also necessary for achieving the Board's goal of providing relief to the POTWs tributary to high radium sourcewater.

Protection of Drinking Water Intakes

U.S. EPA also expressed concerns in its comments to the Board that a final radium water quality standard must assure that drinking water intakes are protected. PC 41 at 1. It can be argued that in one important respect the language of the Board's Second First Notice is less stringent than the Illinois EPA's original proposal: the Board has removed the use of a Public and Food Processing Water Supply standard matching the U.S. EPA's MCL for radium in drinking water. The Illinois EPA suggests to the Board that a Public and Food Processing Water Supply standard is necessary for radium and should be established at the 5 pCi/L drinking water standard to protect sources of drinking water. The federal drinking water standard is an instantaneously applied standard and therefore a Public and Food Processing Water Supply surface water intake standard of 5 pCi/L should apply at all times. The Illinois EPA is not aware of any existing or anticipated situations where an upstream discharge would cause a Public and Food Processing Water Supply surface water intake to exceed 5 pCi/L, but such a standard should be adopted as a safeguard from that scenario in the future.

Impact of Board's Proposal on POTWs

The Board also solicited comments on whether its use of a 30 pCi/L standard for stream segments that are up to 1 mile downstream of a POTW discharge using drinking water that is greater than 3.75 pCi/L would address the concerns of the regulated community of POTWs in the radium belt of Northern Illinois. As the Agency indicated at the hearings, there is almost no effluent data available from these facilities and very limited ambient stream concentration data. Even with so little ambient or effluent data available, it seems clear that the Board's proposal will not result in the intended relief to the regulated community. An instantaneously applied value of 3.75 pCi/L would be overly protective of wildlife even under the D.O.E. model and even with the 1 mile exemption it is unlikely to achieve the goal of achieving compliance for POTW point source dischargers. On the other hand, an annual average value as recommended above is both consistent with the D.O.E. model's approach and would attain the Board's goal of providing relief to most of the radium belt POTWs.

The City of Joliet has attempted to coordinate some efforts to fill the data gap mentioned above. With the information currently available, the Agency can only make some educated assumptions about the potential impact of the Board's proposal as drafted on these POTWs. These assumptions would be that many, if not most, of the impacted POTWs would have difficulty with an instantaneously applied combined standard of 3.75 pCi/L even 1 mile below their discharge point as those standards are currently implemented. Based on available information on sourcewater concentrations, it can also be concluded that a General Use standard of 30 pCi/L would be met by all known dischargers. It is also anticipated that the majority of dischargers would be able to

achieve compliance with an annual average radium water quality standard of 3.75 pCi/L. The only exception to this might be a handful of POTWs that discharge to streams with an average annual flow rate of zero because the POTWs effluent represents the only flow to the receiving stream. The Illinois EPA anticipates that the long term averaging as proposed by U.S. EPA and with the recommendations suggested in these comments will likely give relief to many of the impacted dischargers in a more defensible manner that is protective of the most sensitive uses of all the waters of the State of Illinois.

Proposed Regulatory Language

The following regulatory construction includes the suggestions contained above:

SUBPART B: GENERAL USE WATER QUALITY STANDARDS

Section 302.207 Radioactivity

- a) Gross beta (STORET number 03501) concentration shall not exceed 100 picocuries per liter (pCi/L).
- b) ~~Concentrations of radium 226 (STORET number 09501) and sStrontium 90 (STORET number 13501) concentration must not exceed 1 and 2 picocuries per liter (pCi/L) respectively.~~
- c) The annual average radium 226 and radium 228 (STORET number 11503) combined concentration must not exceed 3.75 picocuries per liter (pCi/L).
 - 1) For purpose of this subsection, the requirement of Section 302.102(b)(8) of this Part that mixing is not allowed in receiving waters which have a zero minimum seven day low flow which occurs once every ten years does not apply, and
 - 2) Mixing zones for radium dischargers may be calculated using the annual average stream flow present at the point of discharge.

SUBPART C: PUBLIC AND FOOD PROCESSING WATER SUPPLY STANDARDS

Section 302.307 Radium 226 and 228

Radium 226 and 228 (STORET number 11503) combined concentration must not exceed 5 picocuries per liter (pCi/L) at any time.

SUBPART E: LAKE MICHIGAN BASIN WATER QUALITY STANDARDS

Section 302.525 Radioactivity

Except as provided in Section 302.102, all waters of the Lake Michigan Basin must meet the following concentrations ~~in any sample~~:

- a) Gross beta (STORET number 03501) concentrations must not exceed 100 picocuries per liter (pCi/L).
- b) ~~Concentrations of radium-226 (STORET number 09501) and s~~Strontium 90 (STORET number 13501) concentration shall not exceed ~~1 and 2~~ picocuries per liter (pCi/L) ~~respectively~~.
- c) The annual average radium 226 and 228 (STORET number 11503) combined concentration must not exceed 3.75 picocuries per liter (pCi/L).

Typographical Error in Second Notice Opinion

Finally, the Illinois EPA would simply like to bring a typographical error to the Board's attention from its April 7, 2005 opinion. On page 19 the Board states that "Sludge containing between five and 15 pCi/g is also still acceptable...". The figure "15 pCi/g" should have been "50 pCi/g". The Board's Opinion correctly quotes from the transcript page referenced (Tr.4 at 318), but this error (either in transcription or as a misstatement by the hearing) does not correspond to the actual figures in the Memorandum of Understanding between the Illinois EPA and the former Department of Nuclear Safety. See, Exhibit 5, Attachment 1A.

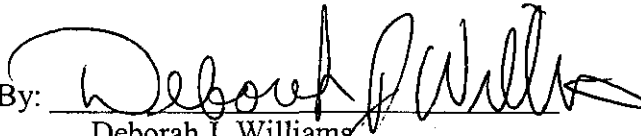
CONCLUSION

The Illinois EPA appreciates the resources the Board has dedicated to the resolution of this regulatory proceeding and the opportunity the Board has granted all parties to the proceeding to participate and present documents and testimony for the Board's consideration. The Agency praises the Board in its efforts to sort out a confusing administrative record and to attempt to fill in scientific gaps with the most appropriate standard possible with the information available. While the Agency strongly disputed much of the testimony and many of the exhibits that were presented for the Board's

consideration by WRT Environmental, some of which were incorporated by the Board in its Second First Notice proposal, the Agency is nevertheless confident that the Board's proposal could provide a General Use water quality standard that is an improvement on the existing standard if the comments of Illinois EPA and U.S. EPA regarding use of a long term average are taken into account and a Public and Food Processing Water Supply standard is incorporated. The Board's Second Notice Proposal does not succeed in accomplishing its stated goals of protecting riparian mammals at the level of 3.75 pCi/L or affording relief to the regulated community. The Illinois EPA is confident that its recommendations regarding application of the General Use standard as an annual average will allow the Board to continue to rely on the General Use water quality standard figure it feels is necessary at this time while affording relief to the vast majority of the impacted POTWs impacted by this rulemaking.

Respectfully submitted,

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

By: 
Deborah J. Williams
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August 15, 2005

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STATE OF ILLINOIS)
) SS.
COUNTY OF SANGAMON)

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached Second First Notice Comments of the Illinois Environmental Protection Agency upon the person to whom it is directed, by placing it in an envelope addressed to:

TO: Dorothy Gunn, Clerk Illinois Pollution Control Board James R. Thompson Center 100 W. Randolph Street, Suite 11-500 Chicago, Illinois 60601	Amy Antonioli, Hearing Officer Illinois Pollution Control Board James R. Thompson Center 100 W. Randolph Street, Suite 11-500 Chicago, Illinois 60601
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SEE ATTACHED SERVICE LIST

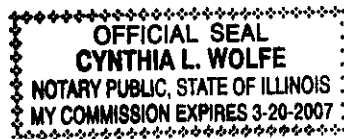
and mailing it by First Class Mail from Springfield, Illinois on August 15, 2005, with sufficient postage affixed.



SUBSCRIBED AND SWORN TO BEFORE ME

this 15th day of August, 2005


Notary Public



THIS FILING IS SUBMITTED ON RECYCLED PAPER

R 04-21 SERVICE LIST

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