UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

FEB 23 2016

RECEIVED
FEB 29 2016 SIPF
WV DEP DWWM
Water Quality Standards

Mr. Scott G. Mandirola
West Virginia Department of Environmental Protection
Division of Water and Waste Management
601 57th Street, SE
Charleston, West Virginia 25304

Dear Mr. Mandirola:

The purpose of this letter is to provide the U.S. Environmental Protection Agency (EPA) views on the statewide aluminum and selenium water quality criteria that the West Virginia Legislature will be considering during the 2016 legislative session. As you know, EPA is in the process of revising the existing Clean Water Act Section 304(a) criteria recommendations for both aluminum and selenium. EPA's revised criteria will reflect consideration of the latest scientific information on toxicity of these parameters. EPA encourages West Virginia Department of Environmental Protection (WVDEP) to consider the draft aquatic life ambient water quality criterion for selenium which EPA published in July 2015, and the latest aluminum toxicity research in order to ensure that West Virginia's criteria are based on sound scientific rationale and that the criteria are protective of aquatic life.

Our comments are on West Virginia's selenium and aluminum criteria adopted by Emergency Rule, as amended September 21, 2015, as we understand these are the values the State Legislature will be considering. Understanding that both WVDEP and EPA are still engaged in discussions, EPA has the following comments on these provisions:

Aluminum

The West Virginia Emergency Rule modified the aluminum criteria for the protection of aquatic life to a hardness-based equation to be applied at certain pH and hardness levels. At pH values outside the 6.5 to 9, and hardness levels outside of 26 mg/L to 200 mg/L, the criteria that was in place before the Emergency Rule would continue to apply.

With the exception of a slight modification of the applicable hardness range, West Virginia's Emergency Rule criteria and supplemental information remain the same as those proposed in 2013. In response to the 2013 proposal, EPA provided information on the latest

scientific studies on aluminum toxicity to aquatic life, as well as an in-depth analysis comparing the studies WVDEP considered in calculating the proposed aluminum criteria with studies EPA is considering in its revisions to the national CWA Section 304(a) acute and chronic aluminum criteria recommendations for the protection of aquatic life. EPA also forwarded the concerns of the U.S. Fish and Wildlife Service (USFWS) that West Virginia's proposed criteria would not be protective of federally listed endangered mussels in the State. EPA reiterated these comments in our July 30, 2015 letter on the proposed revisions to 47CSR2—Requirements Governing Water Quality Standards as proposed in the West Virginia State Register on June 18, 2015.

EPA's main concerns remain the same: WVDEP must justify how the proposed criteria are protective of mussels in West Virginia, as well as appropriately take into consideration potential pH and hardness effects on aluminum toxicity.

Regarding the level of protection that West Virginia's aluminum criteria provides for mussels in West Virginia's waters, we acknowledge WVDEP's concerns with using the Kadar, et. al. 2001 and Pynnönen 1990 studies cited by the USFWS (i.e., both studies were for sub-lethal effects and used species not present in North America). Although those studies will not be used in EPA's anticipated revision of the 304(a) recommended aquatic life criteria for aluminum, they do provide lines of evidence that indicate that more data are necessary to ensure that freshwater mussels are protected in West Virginia waters.

EPA's review of the 304(a) recommended aluminum criteria provided us with the opportunity to contract for a toxicity study to determine the sensitivity of freshwater mussels to aluminum. This study has been completed and is currently being reviewed for quality. Once EPA's review of the study data is complete, EPA will provide the results of the study to WVDEP. EPA anticipates the results of the study will be used in revising the 304(a) recommendation. Until the results of this study are available, it will be difficult for EPA to meet its obligations under the Endangered Species Act (ESA) to find that our approval of West Virginia's aluminum water quality criteria will not adversely affect federally listed threatened and endangered species in the State, most notably threatened and endangered mussels.

EPA also continues to be concerned that WVDEP is not addressing the effect of pH on the toxicity of aluminum. Several additional studies published since WV calculated its revised criteria identify pH as the driving parameter in aluminum toxicity. WV's revised criteria only apply to waters that fall within the 6.5 to 9 pH range. However, WV should consider available data that would allow the state to set water quality criteria for the protection of aquatic life at all pH levels.

Regarding hardness, EPA recommends WVDEP remove the hardness cap of 25 mg/l to 200 mg/l for aluminum. Available data on hardness levels in Ecoregions 67, 69 and 70 that are found in West Virginia indicates hardness levels below 25 mg/l. As with pH, data are available to WVDEP that would allow the state to set water quality criteria for the protection of aquatic life at all hardness levels.

Printed on 100% recycled/recyclable paper with 100% post-consumer fiber and process chlorine free.
Customer Service Hotline: 1-800-438-2474

Finally, EPA recommends WVDEP adopt aluminum criteria as a measure of total recoverable aluminum rather than dissolved aluminum. Total recoverable aluminum is more conservative because it includes monomeric (both organic and inorganic) forms, polymeric and colloidal forms, as well as particulate forms and aluminum sorbed to clays. EPA's revised 304(a) aluminum criteria recommendation will be expressed as total recoverable aluminum in the water column.

EPA has provided WVDEP with references for all the data EPA is using in its revision of its aquatic life aluminum criteria recommendation. EPA will also make the results of the recently completed mussel toxicity study available in the near future. EPA recommends that WVDEP review the information EPA has provided and develop a criterion that is protective of all aquatic species at all conditions in West Virginia surface waters. WVDEP could also consider EPA's proposed aluminum criterion, which is scheduled to be proposed in August 2016.

Selenium

West Virginia made a number of revisions to the Emergency Rule selenium criteria as a result of EPA's July 30, 2015 comments on 47CSR2—Requirements Governing Water Quality Standards as proposed in the West Virginia State Register on June 18, 2015. Our comments were primarily based on EPA's draft freshwater selenium criterion, which we published for comment on July 27, 2015 in the Federal Register (80 FR 44350). In its July 27, 2015 draft, EPA retains the paradigm it first presented in the agency's May 2014 peer review public draft (79 FR 27601), of a criterion with four elements: two fish tissue-based and two water column-based. EPA's draft selenium criterion document states "EPA recommends that states…adopt into water quality standards a selenium criterion that includes all four elements, and express the four elements as a single criterion composed of multiple parts, in a manner that explicitly affirms the primacy of the whole-body or muscle elements over the water column element, and the egg-ovary element over any other element. The magnitude of the fish egg-ovary element is derived from analysis of the available toxicity data. The magnitudes of the fish whole-body element and fish muscle elements are derived from the egg-ovary element coupled with data on concentration ratios among tissues. The magnitudes of the water column elements are derived from the egg-ovary elements coupled with bioaccumulation considerations. Inclusion of the fish whole-body or fish muscle element in the selenium criterion ensures the protection of aquatic life when fish egg or ovary tissue measurements are not available. Inclusion of the water column elements in the selenium criterion ensures protection when neither fish egg-ovary, fish whole-body or muscle tissue measurements are available, and provides consistent coverage for all waters."

EPA commends WVDEP for adopting two fish tissue-based elements consistent with EPA's draft selenium criterion (i.e., 8.0 μg/g for fish whole-body concentrations, 15.8 μg/g for fish egg/ovary concentrations). EPA's draft selenium criterion recommendation includes fish tissue-based elements in recognition of the fact that selenium is bioaccumulative, and toxicity to aquatic life is primarily driven by dietary (chronic) exposure. In light of that fact, EPA no longer recommends an acute criterion, as acute toxicity associated with selenium occurs only at very

high levels, making an acute criterion unnecessary when a protective chronic criterion is in place. WVDEP agreed with that recommendation and deleted its acute water column-based aquatic life selenium criterion of 20 µg/L. However, there are a number of revisions to WV's selenium criteria that need to be considered in order for the criteria to be fully protective of aquatic life in WV surface waters and consistent with EPA's recommendation.

The fish tissue-based elements WV has adopted are consistent with EPA's proposed 304(a) recommendations. However, EPA notes that footnote 2 for 47CSR2, Appendix E, Table 1 indicates that the duration and frequency chronic criterion in WV is a four-day average concentration not to be exceeded more than once every three years, unless otherwise noted. Fish tissue samples integrate selenium bioaccumulation over time. As indicated in EPA's July 2015 draft selenium criteria recommendation, in order to protect the designated aquatic life use and be consistent with EPA's draft 304(a) recommendation, selenium criterion fish tissue elements should be instantaneous measurements that are never to be exceeded. EPA also recommends that WVDEP consider adopting the muscle tissue criterion element consistent with EPA's draft recommended value of 11.3 mg/kg.

WVDEP is not revising the chronic selenium water column element of its criterion (5 µg/l). EPA again recommends that WVDEP review and revise its chronic selenium water column criterion in light of the latest science, as discussed in EPA's Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2015 (EPA 822-P-15-001, July 2015). In its draft, EPA recommended two water column-based elements - 1.2 µg/L for lentic aquatic systems (i.e. still waters) and 3.1 µg/L for lotic (i.e. flowing) aquatic systems - to account for the difference in bioaccumulation between waters with long residence times such as lakes, ponds, reservoirs, or wetlands, versus those with shorter residence times such as rivers and streams. As noted above, EPA's recommended water column elements are derived from the egg-ovary element coupled with bioaccumulation considerations and are intended to be protective absent fish egg-ovary or fish whole-body data. WVDEP has provided no data to indicate that 5 µg/l water column concentration is protective of the egg-ovary element or that the same level of protection is appropriate for both lentic and lotic waters in the state. In order to be fully protective, EPA strongly recommends that WVDEP revise its water column criterion to be consistent with EPA's water column element. EPA also recommends that WVDEP adopt EPA's intermittent exposure selenium criterion element. The intermittent exposure element will assure that the contribution of short-term exposures to the bioaccumulation risk is accounted for in all situations. Application of the intermittent exposure element of the selenium criterion to single day, high exposure events will provide protection from reproductive toxicity by protecting against selenium bioaccumulation in aquatic ecosystems resulting from short-term, high exposure events.

Thank you for this opportunity to provide comments on West Virginia's water quality criteria for selenium and aluminum. Please note that these comments only reflect EPA's position. EPA has an obligation under the ESA to consult with the USFWS to ensure that our federal action will not adversely impact threatened and endangered species in West Virginia and they may have additional concerns. If you have any questions concerning this letter, contact me at (215)814-5717, or Denise Hakowski at (215)814-5726.

Sincerely,

Evelyn S. MacKnight

Evelyn S. MacKnight, Associate Director
Office of Standards, Assessment & TMDLs
Water Protection Division

cc: Laura Cooper (WVDEP)

References

Kadar, E., J. Salanki, R.. Jugdaohsingh, J.J. Powell, C.R. McCrohan, and K.N. White. 2001. Avoidance responses to aluminum in the freshwater bivalve *Anodonta cygnea*. Aqua. Tox. 55: 137-148.

Pynnönen, K. 1990. Aluminum accumulation and distribution in the freshwater clams (Unionidae). Comp. Biochem. Physiol. C Comp. Pharmacol. 97(1): 111-117.

Printed on 100% recycled/recyclable paper with 100% post-consumer fiber and process chlorine free.
Customer Service Hotline: 1-800-438-2474