pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

November 25, 2019

Mr. Andrew R. Wheeler
Administrator
U.S. Environmental Protection Agency
Office of Water
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Attn: Docket No. EPA- 823-D-19-001

Re: Draft Technical Support Document: Implementing the 2018 Recommended Aquatic Life Water Quality Criteria for Aluminum (July 2019)

Dear Administrator Wheeler:

The Pennsylvania Department of Environmental Protection (DEP) thanks the U.S. Environmental Protection Agency (EPA) for the opportunity to comment on the "*Draft Technical Support Document: Implementing the 2018 Recommended Aquatic Life Water Quality Criteria for Aluminum*" (EPA- 823-D-19-001. July 2019). While DEP has been following and in some fashion involved in the development of this draft technical support document for implementing the 2018 recommended aquatic life criteria for aluminum in freshwater, DEP still has concerns that several important comments and technical issues that were raised during the public comment period on the 2017 draft update to the aluminum criteria have not been adequately addressed in the development and release of the 2018 Final Aquatic Life Ambient Water Quality Criteria for Aluminum in Freshwater (EPA-822-R-18-001). So, given the technical issues raised by DEP and many parties in the comments to those criteria, DEP believes that moving forward with implementation of those criteria is premature at this time, and that the earlier comments should be considered, and the criteria revised accordingly before implementation should be discussed.

DEP submitted comments on EPA's "2017 Draft Updated Aquatic Life Criteria for Aluminum in Freshwater" (Docket No. EPA-HQ-OW-2017-0260) and continues to be concerned that EPA published final recommended criteria for aluminum in ambient water on December 21, 2018 (83 FR 65663), superseding EPA's 1988 national recommended criteria for aluminum. In the December 2018 announcement, EPA indicated that it considered the public comments received on the 2017 draft aluminum criteria document received during the extended public comment period in July to October 2017. EPA also describes that it has revised the aluminum criteria document based on consideration of those comments, but DEP and many others still cite the following technical issues, as was commented in 2017:

1. **Conflicting guidance between 1993 memo and proposed 2017 criteria** (re-submitted comment from 2017)

On Oct 1,1993, the EPA released a detailed memo entitled "Additional Material for the Water Quality Handbook". In it, EPA recommended that "State water quality standards be based on dissolved metal."

While the agency recognized that particulate material could be toxic, it reasoned that this bioavailability/toxicity should be less than that of dissolved toxins, noting that "the primary mechanism for water quality toxicity is adsorption at the gill surface which requires metals to be in dissolved form." EPA further stated that "The ambient water quality criteria are neither designed nor intended to protect sediments…" The 2017 draft criteria on aluminum appears to completely contradict this earlier guidance by calling for a "total" instead of a "dissolved" water quality standard for aluminum.

DEP requests clarification on whether the 1993 guidelines are now considered overruled in general or overruled only in the case of aluminum and if the latter case, DEP requests clarification on why aluminum is an exception.

2. **Overrepresentation of bioavailable aluminum** (re-submitted comment from 2017)

Analyzing samples for non-dissolved aluminum requires collection of unfiltered samples, which, depending on how recently precipitation has occurred, may contain significantly varying quantities of suspended soil. Such soil laden samples are then subjected to "digestion" per EPA method 200.7, which has been shown to extract aluminum from clays (See the 2016 work of He and Ziemkiewicz and the references cited therein).[1] Our scientists are observing surges in total aluminum to values above EPA's impairment threshold after rain-related events where large amounts of earth are stirred up into the water column. However, such high-flow events do not coincide with the adverse effects to stream biology that would be expected with toxic metals concentrations. This supports the theory that the sampling and extraction methods result in the reporting of aluminum fractions that are not readily bioavailable.

Considering the forgoing, if the EPA's "total aluminum" criteria are adopted, it is unclear if states are required to list a stream as "impaired" if the total aluminum exceeds the standard only during high flow events.

3. **Hardness vs. calcium content** (re-submitted comment from 2017)

Hardness has long been monitored by water companies due to its tendency to cause mineral deposits in pipes and leave soap scum on bathtubs. The correlation between hardness and ameliorative effects on pollutants has long been known, and since this discovery some work has been done to try to understand what elemental components of hardness are protective and the mechanism behind such protection. For example, research by Davies and Hall has indicated that calcium may be the component in hardness most responsible for biological protection against some common toxins.[2] Knowing what components of hardness are protective and establishing standards based upon them could ultimately lead to better criteria for aquatic life protection.

It is unclear if the EPA considered the possible use of calcium and/or magnesium concentrations to see if they correlate with biological protection better (or worse) than the more general "hardness" parameter.

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[1] Y. Thomas He and Paul F. Ziemkiewicz, "Bias in Determining Aluminum Concentrations: Comparison of Digestion Methods and Implications on Al Management," *Chemosphere* 159 (September 2016): 570–76, doi:10.1016/j.chemosphere.2016.06.052.

[2] Trevor D. Davies and Ken J. Hall, "Importance of Calcium in Modifying the Acute Toxicity of Sodium Sulphate to Hyalella Azteca and Daphnia Magna," *Environmental Toxicology and Chemistry* 26, no. 6 (2007): 1243–1247.

4. Request for replies to other comments submitted in 2017

Many other commenters including several state environmental regulatory authorities submitted comments on EPA's "2017 Draft Aquatic Life Criteria for Aluminum in Freshwater". In the executive summary to the "final" criteria posted on December 21, 2018, EPA states that responses to all of the public comments can be found on the website for the aluminum criteria. However, as of November 25, 2019 there are still no responses. DEP requests that those comments receive due consideration and replies as well.

5. Issues raised regarding use of a "total recoverable" standard are well-established enough and of sufficient consequence to warrant reconsideration of the recommended aluminum criteria

A majority of the 2017 commenters have taken issue with EPA's proposed adoption of a "total recoverable" aluminum standard. Some have even provided data showing the extent to which measurement of non-bioavailable aluminum extracted from naturally-occurring mineral solids in the water stream would result in an "impairment" of a stream which is biologically healthy. The number of these observations from credible state and local agencies as well as in peer-reviewed literature cited indicate this problem is real and ongoing.[3] DEP requests that EPA address this problem in its 2018 recommended criteria for aluminum.

6. Implementation of the recommended aluminum criteria is premature

As serious issues have been raised regarding the utility of aluminum standard as it is currently published, efforts should be now focused on repairing the shortcomings in the 2018 Final Aquatic Life Ambient Water Quality Criteria for Aluminum in Freshwater (EPA-822-R-18-001). Work towards facilitating implementation of the standard, while it should eventually prove useful, is premature at this time.

Should you have any questions or need additional information, please contact Aneca Atkinson, DEP, Deputy Secretary for Water Programs, by e-mail at aneatkinso@pa.gov or by telephone at 717.783.2950.

Sincerely,

Patrick McDonnell
Secretary

[3] Robert C. Santore, Adam C. Ryan, Frode Kroglund, Patricio H. Rodriguez, William A. Stubblefield, Allison S. Cardwell, William J. Adams, and Eirik Nordheim, "Development and Application of a Biotic Ligand Model for Predicting the Chronic Toxicity of Dissolved and Precipitated Aluminum to Aquatic Organisms" Environmental Toxicology and Chemistry 37 (2018) pp. 70–79.