CWWA ACEPU
Canadian Water and Wastewater Association canadienne des eaux potables et usées

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CDW Secretariat
Water, Air and Climate Change Bureau
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To: Committee on Drinking Water Secretariat

RE: Guidance on Aluminum in Drinking Water

CWWA's Drinking Water Quality Committee reviewed the proposed Guidance on Aluminum in Drinking Water.

The Committee supported the proposed MAC of 2.9 mg/L of total aluminum. The document demonstrates that this is a protective health based parameter. However, the Committee if very concerned with the proposed 0.05 mg/L operational guideline. The document provides little scientific justification for setting the operational guideline so low - beyond the need to reduce aluminum concentrations as low as possible.

General Considerations

This is a significant departure from the current OG of 0.2 mg/L (0.1 for direct filtration) based on a 12 month running annual average. Seasonality has a very prominent role in aluminum residuals so the removal of this requirement represents an even more stringent change than just the numerical value. Furthermore, a recommendation to further lower the OG to 0.03 in the winter would be extremely difficult for some utilities to meet.

Predicting when aluminum concentrations will peak is complex and influenced by the pH of the water and treatment processes employed. Treated water levels are often higher in the summer for higher alkalinity waters running at higher pH but for those with low alkalinity waters coagulating at lower pH, the reverse is true and we see higher aluminum in the winter. This is why a running annual average would allow treatment facilities the flexibility to address seasonal concerns.

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According to table 2 which summarizes raw and treated aluminum concentrations by province, all provinces other than New Brunswick have a mean treated or distribution aluminum concentration of above 0.05 mg/L. This demonstrated that the cost and effort for utilities to meet the new operational guideline will be significant.

The document clearly outlines the fact that minimizing residual aluminum to the lowest level possible is important and this should be considered during treatment plant design. However, it fails to consider that many plants across the country were designed many decades ago and may not have the ability to meet the OG without compromising other processes (i.e. downstream effects of coagulant changeover, or increased filter turbs through the required pH increase needed to reduce aluminum which compromises the filtration process and particle breakthrough, or significant capital investment and operating challenges including chemical handling for addition of pH adjustment).

Our Committee noted that the document referenced personal communications with a Dr. Edzwald - for example Table 10, that discusses achievable cold and warm water aluminum concentrations seems to rely heavily on these communications. While some members of the Committee are familiar and respect Dr. Edzwald's work, they are uncomfortable relying on personal communications to develop a guideline based on personal communication instead of peer reviewed literature.

While many provinces will continue to set their own operational guidelines for aluminum for some provinces Health Canada's guidelines will be immediately introduced into facility approvals.

Specific Treatment Considerations

Adding sulfuric acid to adjust the pH of the water is the most common method of decreasing aluminum, but that is far from a trivial process adjustment, and can cause downstream impacts to the system, then can require further interventions.

The proposed OG will be extremely difficult to achieve for many alum-based treatment plants that wish to remove NOM, especially during cold water conditions. The optimum coagulation pH for NOM removal is often in the 5.5 – 6.0 pH range which will is well below the minimum solubility point for aluminum in cold water. This means that aluminum residuals will range from 0.02 mg/L in summer to 0.25 mg/L in winter in order to optimize NOM removal which minimizes disinfection by-products, regrowth, and aesthetic water quality. Similarly, the recommendation to lower the OG to 0.03 during winter is even more challenging. Aluminum is just one of several balancing factors in optimizing the coagulation process, and often less important compared with optimal particle capture and NOM removal.

Conclusion

CWWA's Drinking Water Quality Committee does not support an Operational Guideline of 0.05 mg/L. The Committee feels that the operational experience of many Canadian water utilities does

not align with concern for alum precipitation when >0.05 mg/L. The document does not provide practical evidence or justification for operational or hydraulic impacts when aluminum is above 0.1 or higher. Due to the seasonality of aluminum peaks, CWWA recommends that whatever operational guidelines be adopted it should be based on rolling annual average, this would take seasonal peaks into consideration, providing the necessary flexibility without requiring costly water chemistry adjustments.

Thank you for your consideration

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