

To: Portland Utility Board  
Melissa Merrell

From: Mike Weedall

Date: June 27, 2017

Subject: Review of American Water Works Association (AWWA) Water Quality and Treatment Handbook (5<sup>th</sup> ed) & Resulting Questions

The purpose of this brief memorandum is to share key thoughts gleaned during a review of the above cited book. This lengthy and highly technical guidebook intended for professionals was loaned to me by the Portland Water Bureau. Given that I am not a water quality specialist and dealt with water issues as only one topic during my electric utility management career, I personally felt the need to learn more given the recent discussions before the PUB regarding how to respond to the existing water quality waiver revocation for the Bull Run Watershed. Further, in discussions with our Co-Chairs, the very detailed nature and length of the AWWA Handbook does not make it practical to distribute to the entire Board.

Instead, I will cite some key sections and pages that I found enlightening and pertinent. Those sections will be provided with this memo. I will purposely keep the recommended reading page short given the demands on all of our time. I will then list the original questions I developed and submitted earlier requesting clarification at our next PUB Meeting.

#### Key Sections & Pages I Recommend Be Distributed

Page 14.21-22—Pathogens of Concern

Pages 14.1-14.4—First four pages of Disinfection Chapter

Pages 2.11-12—Cryptosporidium parvum

Page 2.4—Table 2.1 Waterborne Disease Outbreaks in U.S. 1980-1996

Pages 3.14-3.21—Examples of Treatment Process Selection

#### Questions

- It is apparent from the AWWA guide that ultraviolet treatment has many limitations. Not only is it essentially limited to cryptosporidium, but when the quality of the water changes to even slightly more than 5% turbidity, then the treatment becomes

very problematic. (If I need to be corrected on the previously stated facts, please correct.) Further, the AWWA Guide points out there are new viruses, etc. that are constantly evolving that water managers have to identify and then determine how to treat. So my question ultimately focuses on a risk management focus. What is the risk to the city to build an ultraviolet treatment plant and then find out there will likely be additional challenges to treat?

- If money was no issue, what is the best overall treatment approach to take today to best position the city for what may possibly develop in the future? What is the relative cost of this most comprehensive approach compared to the ultraviolet plant currently cited as about \$100 million?
- The AWWA guide also states very small amounts of crypto (oocysts) are typically not well screened using a multi-level sand type screening. Other than ultraviolet, what other technologies best screen for this challenge?
- To my brief reading of this tome, what chemical treatment approaches has the city considered compared to an ultraviolet approach?
- Given the magnitude of the decision and possible investment/rate impact requirements, what is the possibility of going to the regulatory body and presenting a schedule to allow more thorough analysis of the possible technical approaches and the financial requirements. In my experience in the electric utility industry, while not always granted, a well-structured plan presented with firm dates to move ahead in a thoughtful manner was hardly unknown in securing additional analysis time.
- I continue to be skeptical about the true viability of detailed drawings and engineering design for a UV plant developed 5 years ago. Not only is it a matter of availability of equipment and similar specifications to fit footprints, but there is also the issue of technology/equipment improvements that have occurred in the past five years. I believe there should be a quick review of the current plans by a third-party to determine how much additional engineering design might be required. When framed as part of a plan that is included in a request for longer time to conduct a thorough analysis, such a review would ensure the city understands exactly what the magnitude of changes would be required to the current UV detailed design.