



## **Madison Water Utility**

Tom Heikkinen – General Manager  
Alan L. Larson PE, BCEE – Principal Engineer

119 E. Olin Avenue  
Madison, Wisconsin 53713  
Telephone: 608 266-4651  
FAX: 608 266-4426

# **MEMORANDUM**

Date: January 24, 2014

To: Water Utility Board

From: Al Larson, PE, BCEE  
Principal Engineer

Re: **Pilot Study for the Proposed pH Adjustment at Well 15**

I would like to update the Water Utility Board on the status of the proposed pH adjustment at Well 15. Following the startup and commissioning of the VOC air stripper at Well 15 it was noted that the pH of the water was consistently above 8. An increase in pH is the direct result of removing carbon dioxide (CO<sub>2</sub>) during the air stripping process. Increased calcium carbonate scaling was noted in the sample line to the chlorine analyzer and to the chlorinator resulting in increased maintenance. Reports also started to come in on excessive scaling in some residential water meter screens around the area. The situation was initially discussed with Abigail Cantor and Dr. Greg Harrington and calcium carbonate saturation resulting from the higher pH was identified as the probable cause of the increased scaling. This was confirmed by conversations with and water samples analyzed by Hawkins Chemical. The recommendation to reduce the scaling was to lower the pH to the 7.8 range, closer to neutral. This recommendation was evaluated and confirmed by the Water Quality Technical Advisory Committee. Discussions with the DNR also indicated that this was the correct course of action.

pH adjustment in water treatment is a commonly used method to mitigate issues such as corrosion or excessive scaling. Adding a base to raise the pH or an acid to lower the pH is used to adjust the water chemistry to optimal conditions. At Well 15 we are planning to add an acid to reduce the pH to around 7.8 or 7.9 to reduce the calcium carbonate saturation and thus reduce scaling potential. A small amount of sulfuric acid will be added to the water using a chemical dosing pump following the air stripper before the water enters the reservoir. An on-line pH monitor will record the pH of the water leaving the station and allow the chemical feed to be optimized.

The first step in the implementation of this system is a pilot study. We are working closely with the DNR to design and conduct a pilot study of the acid feed system. We anticipate running one of the two air strippers at a rate of 1,000 gpm (1.44 million gallons per day) and using a single acid feed system for approximately one month. We expect to start the testing in early February. Using the information that we gain from the pilot test, we will work with the DNR to design and construct a permanent system. We anticipate that the permanent system will be on line in April and ready for the summer months.

We hope that this answers any questions you may have concerning this process. Please let us know if you have any comments or concerns about any of this.