Corrosion Control: It’s the LAW

On July 1, 2002, a new state law (Section 41-26-8(h), MS Code of 1972 Annotated) was put into effect that required all public water systems that provide corrosion control treatment to maintain a minimum pH in the treated water that is provided to customers. The new law was in response to customer’s complaints of “blue” water and staining caused by corrosion of metal service lines and household plumbing. Corrosion of copper service lines can cause blueish stains on fixtures along with similar water discoloration. The Mississippi Legislature acted to require all existing and future corrosion control treatment plants to be properly operated and maintained. Most water system officials are already familiar with the corrosion control provision of the Lead and Copper Rule, but as plumbing fixtures reduce the content of lead, the violations of the Lead and Copper Rule become less prevalent even though the water may still be corrosive. This action by the Mississippi Legislature should reduce damage to customer’s plumbing and fixtures due to inadequate operation and maintenance of corrosion control treatment facilities.

A memo from the Mississippi State Department of Health (MSDH) was sent on June 12, 2002, to all the class B and C systems in the state making the certified operators and responsible officials aware of the new law, but not all of these class systems run corrosion control plants. The memo stated that the certified operators of a corrosion control plant should maintain a pH of 8.4 unless the system has a written request from the Mississippi Department of Health that states a pH of other than 8.4 be maintained.

Since that memo was sent, MSDH engineers have been working on a process for calculating a precise theoretical target pH and range that is unique for each treatment plant of each impacted water system. The result of the work has produced a simple and straightforward process and calculation that will be made during the next annual survey of the water system.

This process includes taking recorded physical and chemical water analysis values of calcium (Ca) and alkalinity (Alk) from a specific well that feeds into a treatment plant and measuring and recording the pH of the water from the aerator effluent.

The aerator effluent pH and the raw water alkalinity from the well is used to calculate the residual carbon dioxide (CO\textsubscript{2}). This calculated value not only is necessary in further calculations of the target pH, but it also can determine the efficiency of the aerator at removing CO\textsubscript{2} from the water. If it is found that not a significant amount of CO\textsubscript{2} is being removed, then the aerator may not be functioning properly. Also if the aerator is not efficient, more chemicals may have to be added to take out the excessive CO\textsubscript{2} and to raise the pH to the target pH, and this could increase operating costs for treatment of the water.

Once the chemical for corrosion control is added, which includes lime, soda ash, or caustic soda, the water chemistry of the water will change. Calcium and alkalinity is added to your system. Exactly how much calcium and alkalinity will be added to the system is determined by which chemical is added and the amount of residual CO\textsubscript{2} that is calculated. If lime is added, then both calcium and alkalinity are added to the system. If either soda ash or caustic soda is added, only alkalinity is added to the system.

Once the amount of calcium and alkalinity that is added to the system is calculated, then the target pH can be calculated.

This calculation procedure can be easily adapted to a computer spreadsheet program if water system personnel wanted to check the treatment process themselves. Starting this fiscal year (2002-2003), the surveying engineer will make this calculation during the water system’s annual inspection and report what the target pH and the range should be. This pH will be the new number that the certified waterworks operator will maintain for corrosion control purposes for that particular treatment plant. Each target pH and range is unique for each treatment plant. So if a water system has two corrosion control treatment plants, they would need a unique target pH for each plant.

MSDH engineers will calculate and report the official target pH for each corrosion control treatment system, and penalties will be enforced if they do not maintain the target pH range. If any violations of this new law are apparent, then administrative penalties of up to $25,000 per day of violation could be made against the public water system, the officials, and the operators of the system in violation.

Until the annual survey is conducted, it is critically important that corrosion control treatment be repaired (if needed) and be functioning properly. Furthermore, water systems with corrosion control should maintain a pH of 8.4 unless the system has a written request from MSDH officials that a pH of other than 8.4 be maintained.

For more information, contact the Mississippi Department of Health, Division of Water Supply, (601) 576-7518