Filtration is essential to produce high-quality treated water and protect public health, as detailed in this month’s Getting Optimized column (page 8) and Filter Optimization article (page 14). Coagulation and pretreatment processes prepare water for filtration, but the benefits derived from these processes can be lost if a filter isn’t controlled and managed properly. Below are some backwash tips to help operators manage filters more effectively to attain high water quality.

MODIFIED BACKWASH TECHNIQUES

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AWWA’s Manual of Water Supply Practices M37, Operational Control of Coagulation and Filtration Processes, examines a variety of filter operation and management approaches, including the following modified backwash techniques:

- **Adding Coagulant to Backwash Water.** The technique of adding coagulant chemical or polymer to backwash water during the latter stage of a filter wash has been used for decades. When this is done, shut off chemical addition before ending the filter wash so the wash water in the underdrain and piping doesn’t contain added coagulant or polymer, as this water will be the first produced when filtration resumes. Generally, the chemical used would be a positively charged coagulant. The appropriate chemical dosage may need to be determined in pilot plant or full-scale plant filtration trials.

- **Adding Coagulant Chemical to Filter Influent.** Adding coagulant chemical or polymer to filter influent water while the filter box refills after backwashing finishes has been shown to work with metal coagulants and with cationic polymer. Dosage is determined on a trial-and-error basis, but at some utilities the alum dosage (based on the volume of water in the filter box between the top of the media and the water surface) is about one-third of the alum dosage used for coagulation in pretreatment.

- **Filter Resting.** Leaving a filter off-line after backwashing for a ½-hr–24-hr period has improved filter effluent turbidity at some plants. If this is done at utilities where excess filtration capacity exists, operators need to avoid leaving a filter out of service too long. Even if a free chlorine residual is carried onto a filter bed, the media will have some attached bacteria. In a worst-case scenario, coliform bacteria might grow in the idle filter and cause coliform-positive samples in filter effluent.

- **Filter-to-Waste.** Filter-to-waste reduces the effects of particle breakthrough after backwash. The process involves wasting poorer-quality water from a filter for a period of time after the filter is returned to service. This is a way to operate the filter to allow for improving filtrate quality without sending filtered water to the clearwell if it doesn’t meet the utility’s quality goal. An effective approach is to employ online turbidity analysis of the filter-to-waste water to allow wasting filtrate until the quality goal is attained.