Effects of Water Quality Variation on Arsenic Removal

Joon H. Min, Christian Tasser, Amily Zhang, Hiriti Haileselassie, Lina Boulos, Gil Crozes, and Robert Cushing

Carollo Engineers

10540 Talbert Ave. Suite 200 East

Fountain Valley, CA 92708

email: jmin@carollo.com

As the more stringent arsenic MCL is adopted, there is a need to re-evaluate available arsenic treatment technologies and to develop cost-effective and innovative methods to deal with arsenic for small systems. Among the arsenic treatment alternatives, single-use media adsorption provides the simplest approach for small-scale wellhead treatment. This approach also minimizes generation of arsenic-laden waste that is difficult to manage where discharge option is limited. These advantages have prompted the recent advancement in arsenic treatment focused on adsorptive media.

Media technology, however, is most prone to arsenic leaching due to pH or other water quality upsets. Unlike precipitation or separation treatment processes, media adsorption retains and accumulates arsenic in the treatment train until the spent media are changed out. Therefore, the risk associated with arsenic leaching is greater in this case, and warrants further investigation. For many of these media, the addition of acid to lower the pH upstream of the media adsorber is often recommended to reduce the operating cost by providing a greater capacity for the media.

Under certain water quality conditions, such as changes in pH and other constituents, arsenic may be leached from the near saturated media depending on the level of fluctuation and media type. The potential risk of such release should be evaluated thoroughly to develop feasible guidelines to prevent unintentional water quality variations due to system failure, operational changes, or natural fluctuation. Therefore, such occurrences are evaluated, and the mitigation strategies are developed to prevent arsenic spikes in the treated water.

Bio:

Joon Min with Carollo Engineers has been working on a number of arsenic projects since 1993. He served as principal investigator for three AwwaRF projects on arsenic treatment for drinking water and process residuals. He also served as a task leader/technical advisor for several municipal arsenic projects including the one for the Los Angeles Department of Water and Power. Prior to joining Carollo, he has worked at the Metropolitan Water District of Southern California, where he participated and managed a number of treatment projects to remove emerging contaminants such as perchlorate, bromate, NDMA, and MTBE. He lectured a graduate course in water chemistry at UCLA for three years and studied at UC Berkeley, UCLA, and Caltech.