Operation & Maintenance of Membrane Facilities

By the American Membrane Technology Association

Due to the nation's thirst for greater volumes of high quality water, the number of membrane water treatment facilities continues to grow dramatically. The growing cost-effectiveness of membrane treatment is directly attributable to the expanded use of the technology, coupled with the growing professional knowledge base of those experienced and trained in the proper operation of these facilities. As a result, membrane-treated water can now be obtained in a safe, reliable manner at a competitive cost.

Design for efficiency

Effective and efficient operation of a membrane treatment facility begins in the project planning phase. To achieve long-term benefits, it is necessary to take into account parameters such as raw water quality, membrane performance when treating the actual raw water supply, membrane fouling potential and byproduct (concentrate) water quality. This information can be obtained through onsite pilot testing, unless the proposed facility is duplicating an existing facility using the same raw water. Whenever possible, design and pilot testing should be performed with the involvement of future operational staff in order to gain their input on operational issues and familiarize them with the process.

Staff training & support

Even the best designed and built facility will fail if those operating and maintaining it are not given the necessary training and support. The use of high quality equipment and computer-based operation and control does not guarantee the continuous production of safe water if the staff is not capable of upkeep. Many consider membrane operations training provided by the American Membrane Technology Association (AMTA) and its regional affiliates as a cost-effective means of addressing this need.

In addition, sharing case histories and other membrane process knowledge while networking with industry peers can prove to be very useful to staff members. Cooperative training exchanges between utilities during normal operations are also beneficial.

System monitoring & maintenance

Membrane water treatment facilities can prove to operate in a steady state if the input parameters, such as raw water quality, remain constant and the plant is maintained properly. This is one reason the technology has been widely accepted and many facilities are routinely operated with only minimal human oversight. Raw water quality, however, must be reviewed frequently, and operational parameters of the membrane treatment train should be continually trended and compared with original start-up conditions. Pretreatment efficiencies and post-treatment works should also be monitored closely. These tasks can alert operators of pending problems in time for corrective action before production capabilities are impacted. While some changes in the treatment process may not significantly impact plant productivity or finished water quality, they may result in membrane degradation, more frequent cleaning and generally higher operating costs over time if not properly addressed.

When treatment upsets or equipment failures become apparent, it is critical that adequate maintenance resources are made available. Routine preventive maintenance should be performed, and responsiveness to unforeseen repairs needs to be timely. Unlike other treatment technologies, which produce lower-quality product as the raw water quality degrades, membrane systems produce consistent water quality while sacrificing themselves. Therefore, early detection of raw water changes and adjustments made to the operational parameters to accommodate the changes are key to successful plant operation.

Widespread acceptance & application

Relative to other water treatment processes, membrane technologies are often thought of as the most widely accepted means to improve and expand water supplies. The operation and maintenance of state-of-the-art membrane treatment plants is typically easy. As a result, the world is racing to implement this reliable and cost-effective technology to improve water quality and increase supplies. WWD

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