American Membrane Technology Association

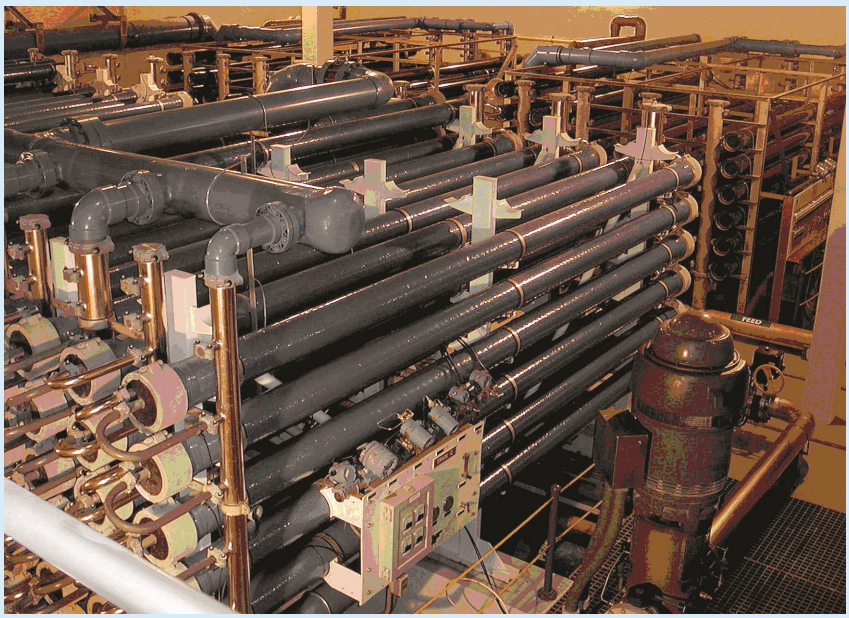
America's Authority in Membrane Treatment

Operation & Maintenance of Membrane Facilities

With the nation's thirst for greater volumes of high quality water, the number of membrane water treatment facilities continues to grow dramatically. The cost of desalination once thought of as financially prohibitive, now is very competitive with conventional treatment. 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 operations of a membrane treatment facility begins in the project planning phases. Long term benefits will be achieved if an early understanding is obtained regarding critical plant operating parameters such as raw water quality, membrane performance when treating the actual raw water supply, membrane fouling potential and by-product (concentrate) water quality. This highly valuable information is normally obtained through on site 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 provide them with greater familiarity with the process. Pilot Testing provides instills confidence in design allowing it to |progress efficiently while giving operators worthwhile training and experience. Long term value can now be incorporated in the plans and specifications for a facility. The product of this practice will be an optimized combination of minimized capital cost with the lowest possible recurring expense for operations and maintenance.



Staff Training & Support

It is important to note that the best designed and built facility will fail if those operating and maintaining the plant are not provided the training and support needed. The use of high quality equipment and computer-based operation and control does not guarantee the continuous production of safe water; the plant must be operated by qualified and well-trained personnel. Undoubtedly, the staff is the most valuable asset of any utility.

There now exists many training opportunities for future membrane plant operators. Many consider membrane operations training as provided by AMTA and its regional affiliates as a cost effective means to address this need. Facility start up services through the design engineer and system supplier are also critical to familiarize operators with the actual facility with the support of those already knowledgeable in the process until such time they are ready to take it over.

An enormous amount of operational experience presently exists throughout the United States. One common means of sharing this information is through technology transfer workshops and conferences offered routinely by AMTA. Sharing of case histories and other membrane process knowledge while networking with industry peers can prove very useful. Cooperative training exchanges between utilities during normal operations are also beneficial to utilities looking to train staff in advance of start up of a new

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treatment plant or to simply share day to day operating means and methods employed.

System Monitoring & Maintenance
Membrane water treatment facilities can prove to operate in rather a steady state condition if the input parameters such as raw water quality remains 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. However, the importance of monitoring the operation can not be overstated. Raw water quality must be reviewed frequently and operational parameters of the membrane treatment train should be continually trended and compared to 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 to occur 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. As with any industrial facility, routine preventive maintenance activities should be performed prudently as scheduled, while responsiveness to unforeseen repairs also 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 making adjustments to the operational parameters to accommodate the changes, and are the key to successful plant operation. A well designed plant should include the necessary "tools" and have proper and adequate provisions for conducting routine tests and inspections. A well equipped laboratory, tools and provisions for probing, sample points for profiling are just a few examples of such provisions.

Widespread Acceptance and 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 are typically easy to operate and maintain. As a result, the world is racing to implement this reliable and cost effective technology to improve water quality and/or increase supplies.

This material has been prepared as an educational tool by the American Membrane Technology Association (AMTA). It is designed for dissemination to the public to further the understanding of the contribution that membrane water treatment technologies can make toward improving the quality of water supplies in the US and throughout the world.

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