

## MASAR Intensive Training Course on









### Membrane Desalination Technologies in Practice

An **advanced** and intensive membrane desalination technology training course is designed and conducted over 3 days by **Eng. Mohamad Amin Saad**, President and Chief Consultant & Trainer of MASAR Technologies, Inc., USA. It is designed for membrane-based water desalination plant operators, engineers, managers, owners and end-users, with at least one year of hands-on field and/or technical experience, primarily at seawater and brackish plants utilizing RO and other integrated membrane processes. The course's format will combine formal presentations and group interactive discussions, problem-solving and experience-sharing, highlighted in several 30-minute open-forum periods throughout the course sections to encourage proactive participation via questions, input and feedback. Main topics of discussion are detailed in the attached Course Agenda below. The course includes a multi-media, interactive Training **Course CD-ROM**, specially designed as a practical and on-the-job training resource, containing all presentation slides, selected technical publications and useful on-line resources. A **Course Workbook** is also available (PDF file) for presentation and discussion. The course is conducted in English.



## Course Focus & Topics

The course primarily focuses on seawater desalination utilizing reverse osmosis and other integrated membrane technologies such as nanofiltration, ultrafiltration and microfiltration. Main topics of discussion include (*see detailed agenda below*):

-  **PLANT DESIGN & OPERATION OPTIMIZATION**
  - *Impact of feed water sources & quality.*
  - *Criteria for membrane selections.*
  - *Recovery ratio optimization.*
  - *Membrane maintenance optimization.*
  
-  **PRETREATMENT REQUIREMENTS**
  - *Membrane scaling & fouling potential & calculations.*
  - *Chemical pretreatment types.*
  - *Filtration Techniques – design, operation, maintenance & problems.*
  
-  **MEMBRANE TECHNOLOGY OVERVIEW**
  - *Membrane process applications – RO, NF, UF & MF.*
  - *Membrane materials & configurations.*
  - *Membrane System Design & Integration.*
  
-  **SYSTEM OPTIMIZATION**
  - *Recovery Ratio Optimization.*
  - *Brine & Product Staging Configurations.*
    - *Design Integration – Hybrid Plants.*
  - *Pilot Plants – Design, Operational, Monitoring & Evaluation.*
  - *Comparison of traditional pretreatment and integration of UF and MF as pre-treatment for RO and NF and other hybrid systems.*
  
-  **PLANT PERFORMANCE MONITORING & OPTIMIZATION**
  - *Data automation, reporting technologies.*
  - *Plant operation monitoring systems.*
  - *ASTM normalization, trending & performance evaluation.*
  - *Real-time optimization & fouling monitoring – **Silent Alarm™** technology.*
  - *Arabian Gulf plant case studies.*
  
-  **MEMBRANE FOULING & SCALING CONTROL**
  - *Field-proven preventative techniques & practices for effective control of biological, colloidal & organic fouling & chemical scaling.*
  - *Fouling prevention technologies, strategies & tools.*
  
-  **TROUBLE-SHOOTING & TESTING**
  - *Overview of Plant Performance Problems Symptoms & Possible Causes*
  - *Specialized Testing Techniques & Tools*
  
-  **TOP 30 PRACTICAL GUIDELINES**
  - *Field-proven practices for optimal and trouble-free membrane plant design, operation and maintenance.*



*English Course CD-ROM Menu*

### Who Should Attend?

The practical and intensive training course is especially designed for membrane-based water desalination and purification plant operators, engineers and managers with varied levels of field experiences and industrial training. It is also beneficial for marketing, business, finance and other professionals seeking a better and practical understanding of membrane technology applications and markets.

Each trainee will receive a comprehensive, course **CD-ROM**, with over 200 presentation slides, summary of practical plant O&M guidelines, technical papers, useful references and on-line resources. It is designed with web-style hot links, colorful graphics and illustrations for on-the-job continuing education and reference by plant operators, engineers, supervisors, consultants, vendors and others. **We are the ONLY trainer in the water treatment and desalination industry giving out a full course training presentation CD-ROM to attendees.** Trainees also receive a workbook with copies of all presentation slides for review, questions and follow-up during presentations.



MASAR Course includes this interactive, multi-media Course Training CD-ROM  
(Arabic CD is available separately upon request for an extra fee)

### Course Instructor & Leader



Course Instructor & Leader: **Eng. Mohamad Amin Saad**

The course is conducted by **Eng. Mohamad Amin Saad**, President and Principal Consultant & Trainer of **MASAR Technologies, Inc.**, USA. Eng. Saad has extensive field, technical and business experiences in the water desalination and membrane technology industry totaling over 36 years, especially in designing, monitoring, optimizing and trouble-shooting tens of key brackish and seawater RO plants around the globe, especially in Saudi Arabia, Kuwait, United Arab Emirates, Bahrain, Malta, the Caribbean, the United States and many others with capacities ranging between 1-60 MGD. They also have been involved in conducting on-site and classroom technical training seminars and courses to membrane plant and industry trainees since 1984, including courses conducted at the conclusion of the IDA World Congress in Bahrain (March 2002), the Bahamas (August 2003), Singapore (September 2005), and the upcoming 2007 Congress to be held in Gran Canaria, Spain. He also

conducted short courses in association with EDS' EuroMed and Desalination & the Environment conference series in Malta (May 2003) and Morocco (May 2004), as well as many other training events held worldwide. He recently conducted a 2-day intensive training courses in Dubai (January 2006) with the International Institute for Research's Middle East Water and Wastewater Conference, with DEWA in Jebel Ali (November 2006), and with the 2006 Water & Power Forum in Jeddah, Saudi Arabia (November 2006).



A detailed 3-day Course Agenda is attached below.

## 3-DAY TRAINING COURSE AGENDA

On

### MEMBRANE DESALINATION TECHNOLOGIES IN PRACTICE

#### DAY 1:

##### **FEED WATER QUALITY & SOURCES**

- *Raw Water Feed Analysis & Chemistry*
- *Wells & Open Intakes*

##### **PRETREATMENT REQUIREMENTS**

- *Philosophy and Overview*
- *Membrane Scaling & Fouling Potential*
- *Chemical Pretreatment Types*
  - *Disinfection – Chlorination, Chloramination*
  - *Coagulation & Flocculation*
  - *Acidification*
  - *Softening*
  - *Anti-Scalant Treatments*
- *Filtration Techniques – Design, Operation & Problems*
  - *Depth Filtration – Pressure Media & Gravity*
  - *Activated Carbon Filtration*
  - *Cartridge Filtration*

#### DAY 2

##### **MEMBRANE TECHNOLOGIES OVERVIEW**

- *Membrane Process Applications*
  - *Reverse Osmosis (RO) & Nanofiltration (NF)*
  - *Ultrafiltration (UF) & Microfiltration (MF)*
- *Membrane Materials – CA & PA & Configurations – HFF & SW*

##### **PLANT OPERATION**

- *Operational Parameters & Data Management*
- *Monitoring, Testing and Instrumentation*
- *Membrane Additions and Replacements*
- *Chemical Cleanings & Post-treatments*

##### **SYSTEM OPTIMIZATION**

- *Recovery Ratio Optimization – The Cost Impact*
- *Brine & Product Staging Configurations*
  - *Design Integration – Hybrid Plants*
- *Pilot Plants – Design, Operational, Monitoring & Evaluation*

##### **PLANT PERFORMANCE MONITORING & EVALUATION**

- *Data Collection and Utilization*
- *ASTM Standard Data Normalization and Trending*
- *Real-Time Membrane Fouling Monitoring & Detection*

##### **MIDDLE-EAST RO PLANT CASE HISTORIES**

## **DAY 3**

### **MEMBRANE FOULING IDENTIFICATION & CONTROL**

#### **BIOFOULING**

- *Definition & Symptoms*
- *Biological Growth Phases, Monitoring & Measurement*
- *Effectiveness of Sterilization & Disinfection*
- *Control & Prevention Guidelines*

#### **COLLOIDAL & SILICA FOULING**

- *Definition & Symptoms*
- *Measurement*
- *Control & Prevention Guidelines*

#### **ORGANIC FOULING**

- *Definition & Symptoms*
- *Control & Prevention Guidelines*

#### **CHEMICAL SCALING**

- *Definition & Symptoms*
- *Control & Prevention Guidelines*

### **TROUBLE-SHOOTING AND TESTING**

- *Symptoms & Possible Causes*
- *Specialized Testing Techniques*

### **PRACTICAL DESIGN, OPERATIONAL & MAINTENANCE GUIDELINES**

### **OPEN DISCUSSION, QUESTIONS AND FEEDBACK**

### **CONCLUSION**