

# DESALINATION ENGINEERING

## INTENSIVE COURSES

Three days Interactive Workshop from 4rd - 6th November 2008

Jeddah is the commercial capital of Saudi Arabia, the largest country and the biggest market among the Gulf Cooperation Council (GCC) states.

Situated on the western coast of Saudi Arabia, where the climate is moderated by the Red Sea, Jeddah is located at the heart of the region, positioning the city as the main center of commerce in the Middle East and North Africa with all of MENA's capitals within two hours flying distance.

Site visits and social events are also organized.

**1 RO, NF & Membrane Filtration Technology for Potable Applications**  
*by Dr. Mark Wilf [November 4–6, 2008]*

**2 Desalination Management and Economics**  
*by Dr. Corrado Sommariva [November 4-5, 2008]*

**3 Design of Alternative Intakes for Seawater Desalination Systems**  
*Dr. Thomas Missimer, [November 4, 2008]*

**4 Biofouling Prevention of RO Membranes**  
*Dr. Harvey Winters, [November 5, 2008]*

**5 Innovative Monitoring, Optimization & Fouling Management of Membrane Desalination Plants**  
*Eng. Mohamad Amin Saad, [November 4-5, 2008]*



Vennue: Jeddah Hilton



Organized by:



Bushnak Academy

in association with



International Desalination Association



European Desalination Society

# RO, NF and Membrane Filtration Technology for Potable Applications

Three days Interactive Workshop on November 4-6, 2008

by Dr. Mark Wilf

The seminar topics include practical information about performance and operating conditions of reverse osmosis and nanofiltration technology for brackish and seawater desalting.

The program includes introduction to membrane technology, description of commercial membrane elements, illustration of the membrane system design process and overview of systems operation. Calculations of the investment and operating cost of membrane plants, based on design cases will be illustrated. A section of the seminar is dedicated to the modern microfiltration and ultrafiltration technology applied for treatment of potable water and as a pretreatment of feed water for RO systems. An overview of commercial MF and UF membrane products will be provided. It will be followed by a description of the implementation process in large membrane treatment plants.

The seminar is structured in the form of four seven hour a day sessions of frontal presentation combined with hands-on exercises of calculations of operating parameters and evaluation of process economics. It is expected that knowledge gained during the seminar will enable participants to conduct critical evaluation of feasibility and design parameters of water development projects based on membrane technology and estimation of capital and operating cost.

The seminar is directed toward professionals who are familiar with membrane technology, with the objective of providing practical information on commercial products, the design process, operation conditions of membrane systems and economics of the membrane desalting and water treatment applications.

**Location** : Jeddah Hilton Hotel, Special Room rates are available for workshop participants.

**Fees** : before September 30th €1600 and after September 30th €1700.

Fees can be transferred directly to account number 4523296 in Samba Bank or paid by check to Dar Al-Taqiya. Please send a copy of your payment proof on Fax +9662-6600664. Group discount should be negotiated in advance of the workshop.

**How to Register** : Send your name, title & contacts sheet (see last page) with payment proof to [academy@bushnak](mailto:academy@bushnak).



# Desalination Management and Economics

Two day Interactive Workshop on November 4-5, 2008

by Dr. Corrado Sommariva

The course topics include information about desalination technology, starting with basic concepts of water chemistry and desalination mass and energy balance. This is followed by detailed evaluation of two major desalination methods: MSF & MED distillation. The technology description includes theoretical principles of the process, principles of desalination system operation, system design, evaluation of the economics of the process.

The course will describe also the common interface of thermal desalination with associated power plants and various configurations and matching criteria. The course will then illustrate the main aspects of desalination economics including a description of the market environment and prices, project delivery mechanisms (private – turnkey multi contracts etc.) and budgeting a desalination project.

The economic session will be related to both thermal and RO processes. Participants should be end users, turnkey contractors, developers who wish gain a more detailed understanding of thermal desalination and the associated interface with a power plant.

Course objectives are to provide a theoretical basis and practical information desalination technology with emphasis on thermal processes and to become familiar with the basic aspects of the design of a desalination project using thermal technology and with operating conditions of desalination systems.

**Location** : Jeddah Hilton Hotel, Special Room rates are available for workshop participants.

**Fees** : before September 30th €1000 and after September 30th €1100.

Fees can be transferred directly to account number 4523296 in Samba Bank or paid by check to Dar Al-Taqniya. Please send a copy of your payment proof on Fax +9662-6600664. Group discount should be negotiated in advance of the workshop.

**How to Register** : Send your name, title & contacts sheet (see last page) with payment proof to [academy@bushnak](mailto:academy@bushnak).



# Design of Alternative Intakes For Seawater Desalination Systems

One day Interactive Workshop on November 4, 2008

By: Dr. Thomas M. Missimer, Ph.D., P.G.

## COURSE OUTLINE

### DISCUSSION ON THE DESIGN & OPERATION OF CONVENTIONAL INTAKES:

- water quality, biological activity, & sedimentation in the marine environment
- capital costs
- operating costs
- environmental issues

### BEACH WELLS:

- Design and Operation
- pre-design hydrogeologic and water quality investigations
- design optimization and configuration
- comparative costs between beach wells and conventional intakes
- maintenance

### BEACH GALLERIES:

- basic concepts and fundamental design principles
- conventional designs
- modular designs
- self-cleaning systems
- trouble-shooting

- maintenance

### HORIZONTAL WELLS/DRAINS:

- basic design issues
- pre-design hydrogeologic and water quality investigations
- limits on use of the method
- operation of systems
- costs

### SEABED FILTRATION SYSTEMS

- fundamental design concept and history
- slow sand filter analogy
- pre-design hydrogeologic and water quality investigations
- methods to prevent clogging
- assessment of operations of existing systems
- future use of these systems

### DISCUSSION OF ALTERNATIVE SMALL SYSTEMS

### QUESTION AND ANSWER SESSION

**WORKSHOP FACILITATOR: DR. THOMAS** is VP of Schlumberger Water Services USA, Inc., He founded Missimer Groundwater Science, Inc which provides groundwater services in development of water supplies aquifer storage and recovery and water reuse. Schlumberger acquired his company several years ago.

**Location** : Jeddah Hilton Hotel, Special Room rates are available for workshop participants.

**Fees** : before September 30th €900 and after September 30th €1000.

Fees can be transferred directly to account number 4523296 in Samba Bank or paid by check to Dar Al-Taqniya. Please send a copy of your payment proof on Fax +9662-6600664. Group discount should be negotiated in advance of the workshop.

**How to Register** : Send your name, title & contacts sheet (see last page) with payment proof to [academy@bushnak](mailto:academy@bushnak).

# Biofouling Control in Seawater Reverse Osmosis (Swro) Membranes

One day Interactive Workshop on November 5, 2008

By: Professor Harvey Winters.

## COURSE OUTLINE

### SEAWATER CHEMISTRY:

- Salts & Osmotic Pressure
- pH

### MARINE BACTERIA:

- Isolation & Characterization
- Physiology & Growth
- Heterotrophs & VBNC

### REVERSE OSMOSIS (PART I):

- How It Works
- Recovery
- Flux and Critical Flux
- Cross Flow Velocity
- Concentration Polarization (CP)
- Energy Usage & Fouling

### REVERSE OSMOSIS (PART II):

- Membrane Biofouling

- Critical Flux and Bacterial attachment
- Role of CP in Biofouling
- Effect of Cross Flow Velocity

### MEMBRANE BIOFOULING

- Calculation of CP
- Microbial Growth in SWRO
- Biofilm Enhanced Osmotic Pressure (BEOP)
- Biofilm Transition Pressure-Pressure at Which BEOP Initiates

### USE OF COMPUTER PROJECTIONS TO CALCULATE BIOFILM TRANSITION PRESSURE

- Measuring Marine Bacteria Concentration
- What does Computer Projection Tell Us?
- Computing Ratio of Flux to Cross Flow Velocity
- Calculation of Transition Pressure

### HOW TO USE BEOP TRANSITION PRESSURE TO DESIGN SWRO TO PREVENT BEOP FORMATION

**WORKSHOP FACILITATOR:** Professor Harvey Winters is presently Professor Emeritus at Fairleigh Dickinson University, Teaneck, New Jersey, USA and Adjunct Professor at Nanyang Technical University, Singapore.

Professor Winters received his Ph.D. from Columbia University, New York in Chemical Biology in 1970 supported by National Science Foundation (NSF) Fellowship and Columbia University Faculty Fellowship. From 1970-1972, Professor Winters was supported in his research from U.S. Naval Office of Research.

Professor Winters has published over 50 papers on biofilm formation in SWRO and hold one patent with DuPont on use of chloramines to control biofouling in SWRO. Professor Winters has won two awards from International Desalination Association (IDA) for best written papers at two annual meetings. He has been a Director of IDA and currently is a reviewer for Journal of Desalination and Journal of Membrane Research.

Professor Winters from 1990 through 1993 served as JECOR researcher at Jubail Research Center (SWCC) and has received support in his research from Middle East Desalination Research Center and U.S. Department of Interior. He has been consultant on biofouling of SWRO membranes for DuPont, Tampa Bay, and GrahamTek.

### Location

: Jeddah Hilton Hotel, Special Room rates are available for workshop participants.

### Fees

: before September 30th €900 and after September 30th €1000.

Fees can be transferred directly to account number 4523296 in Samba Bank or paid by check to Dar Al-Taqiya. Please send a copy of your payment proof on Fax +9662-6600664. Group discount should be negotiated in advance of the workshop.

**How to Register** : Send your name, title & contacts sheet (see last page) with payment proof to [academy@bushnak](mailto:academy@bushnak).



# Innovative Monitoring, Optimization and Fouling Management of Membrane Desalination Plants

Two days Interactive Workshop on November 4-5, 2008

By: Engineer Mohamad Amin Saad

## COURSE OUTLINE

### I. MEMBRANE PLANT DESIGN CONSIDERATIONS

- Fouling & Scaling Potentials
- Feed Quality & Chemistry
- Feed Sources – Surface & Well
- Pretreatment Design—Chemical Dosing & Filtration Systems
- **Membrane System Design**
  - o Recovery Ratio Optimization
  - o Brine & Product Staging Configurations
  - o System Integration – Hybrid Plants
  - o Pilot Systems – Surface Seawater RO Plants

### II. SYSTEM OPERATION OPTIMIZATION

- Pretreatment Systems
- **Biological Control**
  - o Disinfection
- **Colloidal Control**
  - o Filtration Systems
  - o Coagulation & Flocculation
- Membrane Selection, Additions & Replacements
- Energy Consumption Optimization – Energy Recovery Devices

### III. PERFORMANCE MONITORING & EVALUATION

- Data Collection, Monitoring & Reporting

- ASTM Data Normalization
- Performance Trending
- **Real-Time, Early-Warning Monitoring & Fouling Detection**
  - o Silent Alarm™ Monitoring & Optimization Technology
  - o MASAR® Program Applications

### IV. MEMBRANE FOULING CONTROL STRATEGIES

- **Fouling & Scaling Types**
  - o Biological Fouling
  - o Organic Fouling
  - o Colloidal Fouling
  - o Metal Oxide Fouling
  - o Scaling (Chemical Fouling)
- **Arabian Gulf RO Plant Case Studies**
  - o Brackish RO
  - o Seawater RO
- **Trouble-Shooting Guidelines**
  - o 7 Golden Rules
  - o Symptoms & Solutions
  - o Specialized Testing

### V. PRACTICAL DESIGN, OPERATIONAL & MAINTENANCE GUIDELINES

- Design
- Operation
- Maintenance

**WORKSHOP FACILITATOR:** Engineer Mohamad Amin Saad is a leading industry expert with 24 years of technical expertise and practical experiences worldwide, especially at RO and other membrane plants in the Middle East/Arabian Gulf, Malta and USA. He recently developed from his long field experience the pioneering “Silent Alarm™” system and “MASAR®” software program for real-time monitoring and optimization of membrane plants performance and early detection of membrane fouling before it's too late. He has been training government and corporate clients since 1984, and regularly conducts intensive training courses and workshops with the International Desalination Association's (IDA) World Congresses (Bahrain, The Bahamas, Singapore, Spain), European Desalination Society's (EDS) Conferences (Egypt, Malta, Morocco), and with the Middle East Desalination Research Center (MEDRC).

**Location** : Jeddah Hilton Hotel, Special Room rates are available for workshop participants.

**Fees** : before September 30th €1200 and after September 30th €1300.  
Fees can be transferred directly to account number 4523296 in Samba Bank or paid by check to Dar Al-Taqniya. Please send a copy of your payment proof on Fax +9662-6600664. Group discount should be negotiated in advance of the workshop.

**How to Register** : Send your name, title & contacts sheet (see last page) with payment proof to [academy@bushnak](mailto:academy@bushnak).

# Bushnak Academy



**Bushnak Academy**

Bushnak Academy aspires to be a global leader in providing continuing education and training to the professionals working in power and water industries offering the opportunity to increase their knowledge and capacity. With vast experience and partners in our network we want to put Jeddah on a global map as a hub for excellence in innovative education and training specializing in power, water and environment related industries.

In doing so, we organize numerous courses, seminars, conferences and similar events. After these intensive courses we are preparing yet another event called Jeddah in January (2009). For the details please contact us or log to our website [www.academy@bushnak.com](http://www.academy@bushnak.com)

## Social Events



# REGISTRATION FORM

Please fill the the contacts below

Name		الاسم
Organization		جهة العمل
Job Title		المسمى الوظيفي
Mailing Address		عنوان المراسلة
P.O.Box		صندوق البريد
Country		الدولة
Work Tel.		هاتف العمل
Home Tel.		هاتف المنزل
Mobile		الجوال
Fax		الفداكس
E-mail		البريد الإلكتروني

Mark on course you like to participate:	Date
<input type="checkbox"/> RO, NF & Membrane Filtration Technology for Potable Applications	November 4-6
<input type="checkbox"/> Desalination Management and Economic	November 4-5
<input type="checkbox"/> Design of Alternative Intakes For Seawater Desalination Systems	November 4
<input type="checkbox"/> Biofouling Control in Seawater Reverse Osmosis (Swro) Membranes	November 5
<input type="checkbox"/> Innovative Monitoring, Optimization and Fouling Management of Membrane Desalination Plants	November 4-5

## Methods of Payment

- ☐ Check to “**Dar Al-Taqniya**”.
- ☐ Transfer to “**Dar Al-Taqniya**”  
Samba Bank, Account 4523296 Branch: Al-Andolas Street, Jeddah, Saudi Arabia
- ☐ Electronic Transfer to “**Dar Al-Taqniya**”  
Samba Bank, Swift Code: sambsari

**Please send copy of your Check or Transfer to  
Fax. +96626600664 or by e-mail: [data@bushnak.com](mailto:data@bushnak.com)**

