



PLANNING AND OPERATION OF SEAWATER REVERSE OSMOSIS DESALINATION PLANTS

This training program covers both theoretical and practical aspects associated with engineering and operation of seawater reverse osmosis membrane desalination plants. The program provides brief overview of the fundamentals of membrane desalination and focuses on the practical aspects of design and operations monitoring of all key desalination plant components: intakes, pretreatment, reverse osmosis membrane system, post treatment and concentrate disposal. The program is equally beneficial to desalination plant designers and operators and includes case studies of large desalination plants worldwide.

3-DAY COURSE

Leading Lecturer:

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PROGRAM OUTLINE

Day 1: Desalination Fundamentals

09.00 – 10:30 Overview of Desalination Technologies

- Introduction to Desalination
- Alternative Desalination Technologies
- Electrodialysis
- Ion Exchange
- Thermal Desalination

10.30 – 10.45 Coffee Break

10.45 – 12.00 Reverse Osmosis Fundamentals

- RO Separation – Basic Principles
- Key Performance and Design Parameters
- RO System Components

12.00 – 13.00 Lunch Break

13.00 – 14.30 Planning for Seawater Desalination Plant

- Key Desalination Plant Components
- How to Determine Plant Site Size and Location?
- Source Water Quality Characterization
- Choosing Product Water Quality – Issues and Considerations

14.30 – 14.45 Coffee Break

14.45 – 16.00 Seawater Intakes

- Source Water Quality Issues and Considerations
- Subsurface Intakes
- Open Ocean Intakes
- Selection of Intake
- General Design Guidelines

16.00 – 17.00 Questions & Answers

Day 2: Reverse Osmosis Desalination Plant Planning and Design

09.00 – 10.30 Seawater Pretreatment

- Sedimentation and Dissolved Air Flotation
- Granular Media Filtration
- Membrane Filtration
- Selection of Pretreatment System

10.30 – 10.45 Coffee Break

10.45 – 12.00 Reverse Osmosis System Configuration

- High Pressure Pumps – Type and Applications
- Reverse Osmosis Trains – Alternative Configurations

- Reverse Osmosis Membrane Cleaning System
- Energy Recovery Systems – Type and Applications
- Alternative Reverse Osmosis System Configurations
- Sizing of Key Components of Seawater RO System

12.00 – 13.00 Lunch Break

13.00 – 14.45 Desalination Plant Energy Use

- Key Energy Use Components & Factors
- Methods to Minimize Desalination Plant Energy Use
- Example of Plant Energy Use Breakdown

14.45 – 15.00 Coffee Break

15.00 – 16.00 Seawater Concentrate Disposal

- Concentrate Disposal Alternatives
- On-shore and Offshore Discharges
- Environmental Discharge Considerations

16.00 – 17.00 Questions & Discussions

Day 3 – Desalination Plant Costs and Operation

09.00 – 10.15 Desalination Costs

- Construction Costs
- O&M Costs
- Total Cost of Water Production O&M Costs
- Example of Plant Cost Estimate

10.15 – 10.30 Coffee Break

10.30 – 12.00 Desalination Plant Performance Analysis and Optimization

- Key Plant Performance Parameters
- Main Steps of Plant Performance Analysis
- Optimization of Plant Design and Operations

12.00 – 13.00 Lunch Break

13.00– 14.30 Desalination Plant Operational Monitoring and Troubleshooting

- Operations Monitoring Methods and Equipment
- Troubleshooting of Pretreatment Systems
- RO System Operation and Troubleshooting
- Product Water Testing and Quality Control

14.30 – 14.45 Coffee Break

14.45 – 15.30 Desalination Plant Case Studies

- Fujairah SWRO Plant, UAE
- Al Dur SWRO Plant, Bahrain

15.30 – 16.00 Questions & Discussions

16.00 – 17.00 Multiple Choice Test and Adjourn
