Professional Engineering Services

Operation, Control, Monitoring & Maintenance Of RO System

Course Duration **5 Days**

Who should attend?

Facility/utility engineers, environmental engineers, consulting engineers, technologists, technicians, chemists, operating personnel or anyone requiring a working level knowledge of the theory and practice of reverse osmosis plants. This course will be of particular interest to anyone involved in the operation and maintenance of reverse osmosis or nanofiltration systems.

Course Objectives

An Excellent knowledge of basic operation principles, layout requirements, associated components and maintenance practices for reverse osmosis (RO) plants.

Course outcome

You will gain valuable know-how related to reverse osmosis plants on:

- ✓ Different membrane configurations used for membrane filtration (MF & UF) and RO applications.
- ✓ Understand Osmosis & Reverse Osmosis.
- ✓ Understand RO Principles
- ✓ RO Plant Configuration.
- ✓ Control scaling, fouling and chemical attack by using appropriate pretreatment technologies.
- ✓ Start Up, Shutdown & Daily Operation Instructions.
- ✓ Reverse Osmosis Preventive Maintenance.
- ✓ Reverse Osmosis membranes cleaning.

4 Mahmoud Shokri St. Smouha – Alexandria- Egypt
Tel: +203-9608-542/43 & Fax: +203-4242-441
www.proserve-egypt.com

Course Contents

DAY 1

Part I: Water Sources

- Beach wells.
- Open Intake sea water.
- High, Medium, low Brackish water.
- Surface water.
- Municipal water.

Part II: Water Basics

- Water Make up.
- Interpreting water analysis.
- Water biology.
- Suspended Solids, Turbidity and SDI.
- Special situations e.g. Iron, Manganese and Aluminum.

Part III: Membranes Configurations

- Difference between Cross flow & Depth Flow.
- Microfiltration.
- Ultrafiltration.
- Reverse Osmosis.
- Membranes pore size.
- Membranes Materials & Structure.
- Reverse Osmosis Definitions.
- Factors Affecting RO performance.

DAY 2

Part IV: R.O Plant configuration

- Pretreatment System Components.
- ROMAS (Reverse Osmosis Membrane Assembly).
- Post Treatment System.
- Orientation to R.O Plant" RO Equipments".

Instrumentation.

- Corrosion Control.
- Flush/ Cleaning System.
- Feed Water Specs.
- Alarms and Protections.

DAY 3

Part V: Operational

- Start Up.
- RO Shutdown.
- Daily Operation Instructions.
- Chemicals Preparation.
- Back Wash Process.
- Cartridge Filters Replacement.
- Membrane Flow & Probe Test.
- Membrane replacement.
- SDI Test.

Part VI: Technical

- Units conversion.
- Net Driving Pressure NDP.
- HPP & ERT Efficiency calculations.
- Recovery calculations.
- Membranes performance.
- Pump selection" dozing, feed, etc".
- Proper installation of flow meters.

Part VII: Maintenance

- Preventive Maintenance:

Condition Monitoring your Equipment:

- MMFs & CF
- High pressure pump & motor
- ERT
- Membranes
- Pressure vessels
- Feed/ sea water intake / flushing pumps

- ERT inspection, maintenance, repair
- Pump /motors replacement & alignment
- **Equipments Lubrication**
- PVC repair & installation.

Part VIII: Administrative

- How to maintain a proper & accurate daily log report ?
- Housekeeping

Part IX: Safety

- Hazards
- Fire Fighting
- Safety :
  - Pressure vessels
  - HPP
  - Electric motor
  - ERT

DAY 4

- **Part X: Troubleshooting Spiral Wound RO & NF Systems**
- Importance of record keeping.
- General rule of troubleshooting.
- Signs of trouble.
- Causes and corrective measures.
- Taking the total system approach.

DAY 5

- **Part XI: Cleaning RO and NF Membrane Elements**
- Introductory Remarks
- When to Clean
- Defining a Foulant and Scalant
- pH and Temperature Limits
- FT30 Resistance to Cleaning Agents
- Cleaning Carbonate Scaling
- Cleaning Sulfate Scaling

Professional Engineering Services

- Cleaning Organic Fouling
- Cleaning Biological Fouling
- Cleaning Iron Fouling
- Cleaning Silt Fouling
- Cleaning Carbon Fouling
- Chemical Attack
- Permeate Back Pressure
- The Cleaning Process
- Safety

4 Mahmoud Shokri St. Smouha – Alexandria- Egypt
Tel: +203-9608-542/43 & Fax: +203-4242-441
www.proserve-egypt.com