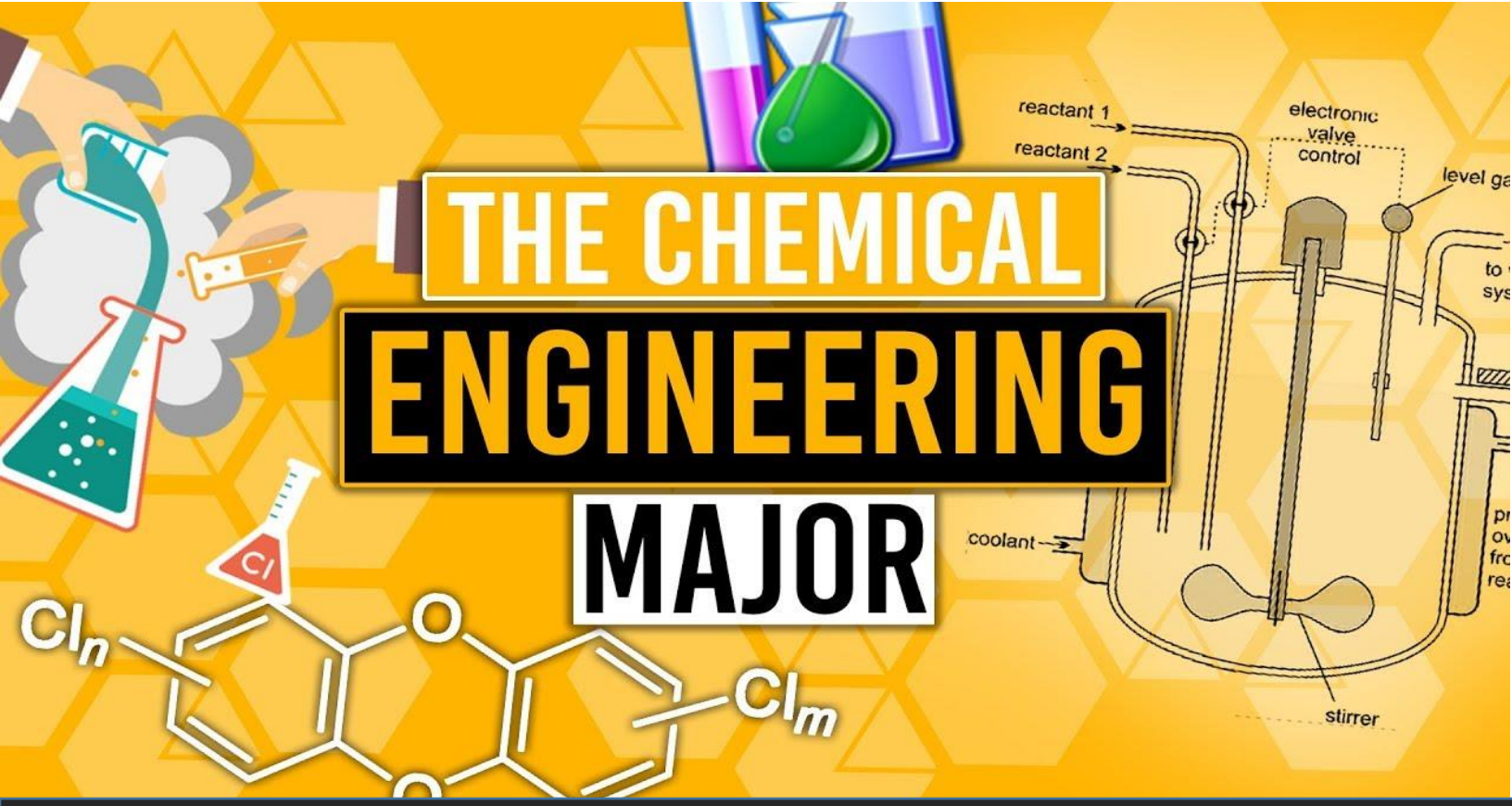

Advanced RO Plant Process and Troubleshooting

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BTS
Training & Consultancy

Advanced RO Plant Process and Troubleshooting

Who Should Attend?

Plant & technical support managers, O & M supervisors, senior mechanical and electrical engineers, senior chemists, environmental and consulting engineers for reverse osmosis plants.

Course Objectives:

After successful completion of the course delegates will have an excellent knowledge RO plant O & M, troubleshooting, design and components' selection, chemical cleaning and RO economics..

`Course Outcome:

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

- Membrane types, application and configurations.
- Understand Osmosis & Reverse Osmosis principles.
- RO Plant Configuration and passes.
- How to operate smoothly RO plant
- Monitor RO plant performance and take necessary corrective action
- Control scaling, fouling and chemical attack by using appropriate pretreatment technologies.
- Reverse Osmosis membranes cleaning.

- Understand RO design.
- RO components selection
- RO economics
- RO Maintenance Management.
- RO performance parameters monitoring and control
- RO process normalization

Contents:

Part I: Membrane Modules Configuration:

- Difference between Cross flow & Depth Flow.
- Microfiltration, Ultra-filtration , RO
- Membranes Materials & Structure.

Part II: RO System Configuration and Design Parameters

- Parameters Affecting Membrane Performance.
- Pretreatment System Components.
- ROMAS (Reverse Osmosis Membrane Assembly).
- Post Treatment System.
- Orientation to R.O Plant system
- Instrumentation.
- Flush/ Cleaning System.
- Feed Water Specs.
- Alarms and Protections.

Part III: Reverse Osmosis System Operation and Maintenance

- RO System Startup and Operation.

- Daily Operation Instructions.
- Chemicals doses calculation and preparation.
- Back Wash Process.
- Cartridge Filters Replacement.
- Membrane Flow & Probe Test.
- Membrane replacement.
- SDI Test.

Part IV: RO Engineering Design Process

- Computer Projections of RO System Performance.
- Acceptance Test and Monitoring System.
- Select the Flow Configuration and Number of Passes.
- Calculate the Number of Elements &Number of Stages.
- Performance Normalization
- Introduction to Piping System
- Pipe types
- Pipes schedule, pressure ratings, materials, etc

Part V: Corrosion Introduction

- Corrosion definition
- Corrosion types and control
- Introduction to stainless steel material types and grades

Part VI: Technical

- Units conversion.
- Net Driving Pressure NDP.
- HPP & ERT Efficiency calculations.

- Recovery calculations.
- Pumping Systems
- Design of pumps and motors.
- Pump construction
- Types of pumps
- Pump selection" dozing, feed, etc".
- Mechanical shaft seal
- The mechanical shaft advantages.
- Types of mechanical shaft seals.
- Electric Motors.
- Some Basic Motor Concepts
- Operating Principles
- Stator.
- Rotor.

- Proper installation of flow meters.

Part VII: Maintenance

- Types of maintenance
- PM
- CM
- Maintenance & repair of :
- High pressure pump & motor
- ERT
- MMFs & CF
- Pressure vessels
- Membranes
- Feed/ sea water intake / flushing pumps

- ERT inspection, maintenance, repair
- Pump /motors
- Equipment's Lubrication
- PVC repair & installation.

Part VIII: Administrative

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

Part IX: Safety

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

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.

Part XI: Cleaning RO and NF Membrane Elements

- When to Clean
- Defining a Foulant and Scalant

- pH and Temperature Limits
- FT30 Resistance to Cleaning Agents
- Cleaning Carbonate Scaling
- Cleaning Sulfate Scaling
- Cleaning Organic Fouling
- Cleaning Biological Fouling
- Cleaning Iron Fouling
- Cleaning Silt Fouling
- Cleaning Carbon Fouling
- Chemical Attack
- Permeate Back Pressure
- The Cleaning Process
- Safety
- Questions & Answers.

SUMMERY AND CLOSING

- Solved examples, field implementation and application