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Course Name

Scaling, Membrane Fouling & Chemical Cleaning in RO Plant

Sector Name

Oil, Gas and Chemical

Document Type

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Course Introduction

Monitoring overall plant performance on a regular basis is an essential step in recognizing when membrane elements are becoming fouled. Performance is affected progressively and in varying degrees, depending on the nature of the foulants. RO cleaning frequency due to fouling will vary by site. A rough rule of thumb as to an acceptable cleaning frequency is once every 3 to 12 months.

RO pretreatment

If you have to clean more than once a month, you should be able to justify further capital expenditures for improved RO pretreatment or a redesign of the RO Operation. If the cleaning frequency is every one to three months, you may want to focus on improving the operation of your existing equipment, but further capital expenditure may be harder to justify.

It is important to clean the membranes when they are only lightly fouled, not heavily fouled. Heavy fouling can impair the effectiveness of the cleaning chemical by impeding the penetration of the chemical deep into the foulant and in the flushing of the foulant out of the elements. The Training Program provides a

practical understanding of chemical cleaning, which can be expensive, time-consuming, and decrease plant performance when it is frequently performed, and learn how to use suitable chemical cleaning. This session will also teach you the most effective and low-cost chemical cleaning.

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Target Audience

- ✓ Process design
- ✓ Unit Operator
- ✓ Environmental
- ✓ Process safety engineer
- ✓ Gasoline blender engineer
- ✓ Lab supervisor
- ✓ Supply chain engineer
- ✓ Distillates analyst
- ✓ Models engineer
- ✓ Chemical Operator
- ✓ Chemical Plant Operator
- ✓ Chemical Process Technician
- ✓ Control Room Supervisor
- ✓ Gas Plant Process Operator
- ✓ Gas Production Operator
- ✓ Gas Terminal Operations and Storage
- ✓ Gathering Pipeline engineer
- ✓ Oil Terminal / Storage engineer
- ✓ Pipeline Maintenance / Equipment / Compliance / Repair
- ✓ Pipeline Testing / Technician / Supervisor / Safety
- ✓ Plant Equipment Operator

✓ Plant Operations Technician

✓ Plant Shutdown

✓ Plant Supervisor

✓ Power Distribution

✓ Power Plant Manager

✓ Process Supervisor

✓ Refinery Operations Technician / Manager

✓ Terminal Operator / Manager

✓ Utilities Operator

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Learning Objectives

- ✓ You will learn to thoroughly understand the basics of how RO units work and understand common problems caused by scaling, fouling, and chemical attack.
- ✓ You will learn how to monitor, troubleshoot, and clean RO Units. You will learn some pretreatment requirements of a membrane system.
- ✓ The course includes practice and theory on Pre-treatment, fouling, and scaling in micro and ultrafiltration, nanofiltration, and reverse osmosis applied for the production.
- ✓ Also, you will learn the impact of the water source, seawater, brackish groundwater water and treated domestic wastewater will be discussed in depth.
- ✓ Learn Scaling Calculations and prediction, and Scaling Control, Monitoring, Antiscalants, and Remedial Actions.

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Course Outline

✓ 01 Day One

Module (01) RO Membranes & Elements

- ✓ Introduction
- ✓ Hyperfiltration
- ✓ Semipermeable Membranes
- ✓ Osmosis
- ✓ Reverse Osmosis
- ✓ Net Driving Pressure
- ✓ Temperature
- ✓ Salt Passage or Salt Flux
- ✓ Membrane Elements

Module (02) Reverse Osmosis Operation

- ✓ Pressure Vessels
- ✓ RO Units
- ✓ Flow Rates
- ✓ Feed Water Salt Concentration
- ✓ Permeate Salt Concentration

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Course Outline

✓ 02 Day Two

Module (03) Reverse Osmosis Problems

- ✓ Scaling
- ✓ Fouling
- ✓ Chemical Attack
- ✓ Percent Recovery
- ✓ Scale Control within an RO Unit
- ✓ Fouling Control within an RO Unit

Module (04) Monitoring RO Unit

- ✓ Monitoring Tools
- ✓ Normalized Permeate Flow (NPF)
- ✓ Pressure Drop
- ✓ Percent Salt Rejection (%SR)
- ✓ Profiling / Instrumentation

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Course Outline

✓ 03 Day Three

Module (05) Activated Carbon Pretreatment

- ✓ Activated Carbon Vessels
- ✓ Normal Services
- ✓ Backwashing
- ✓ Organics Removal
- ✓ Sanitization

Module (06) Chemical Cleaning of RO Units

- ✓ Introduction
- ✓ Remove Scalants
- ✓ Remove Foulants
- ✓ Chemical Cleaning Equipment
- ✓ Good Cleaning Procedures

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Course Outline

✓ 04 Day Four

Module (07) Troubleshooting RO Units

- ✓ High Conductivity from ONE PV
- ✓ Scaling
- ✓ Fouling
- ✓ Chemical Attack

Module (08) Controlling RO Unit Scaling

- ✓ Introduction
- ✓ Scaling Calculations and Prediction
- ✓ Scaling Control, Monitoring
- ✓ Acid Injection
- ✓ Scale Inhibitor Injection
- ✓ Softening
- ✓ pH, Hardness & Alkalinity
- ✓ Anti-scalants
- ✓ Remedial Action

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Course Outline

✓ 05 Day Five

Module (09) Controlling Membrane Chemical Attack

- ✓ Pretreatment & Monitoring to Control Chemical Attack
- ✓ pH
- ✓ Activated Carbon
- ✓ Sulfite Injection
- ✓ ORP & Chlorine

Module (10) Controlling RO Fouling

- ✓ Clarification
- ✓ Media Filtration
- ✓ RO Unit Pre-Filtration
- ✓ Silt Dispersant Injection
- ✓ Silt Density Index
- ✓ Recent Advances in RO Technology

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 19, 2027	April 23, 2027	5 days	4250.00 $	UAE , Dubai
March 15, 2027	March 19, 2027	5 days	4250.00 $	UAE , Abu Dhabi
July 19, 2027	July 23, 2027	5 days	4950.00 $	England , London
Oct. 11, 2027	Oct. 15, 2027	5 days	4250.00 $	UAE , Dubai

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