

**JUSCHEM Presents 2 Days Highly Interactive workshop on
“Best Practices on Reverse Osmosis (RO) Operations and monitoring”**

Introduction

We all have heard about RO but do we all know it's working principle and troubleshooting? Are we operating the RO correctly? Let's see the best practices.

Proper operation and maintenance of Reverse Osmosis (RO) systems are key factors in maximizing long-term plant availability and efficiency with minimized fault-related down times. These key factors must be considered for operation monitoring methods applicable to all RO systems using membrane elements. Reverse Osmosis (RO) is a proven technology with new applications for various industries. The Trainer is having extensive knowledge of RO unit installation, operations, troubleshooting and cleaning procedures. Let's get trained in best practices for RO units.



The training seminar will feature:

- Start-up and shutdown procedures of RO plant
- Operation monitoring methods for RO system
- Soft Logbook – analytics with calculations (algorithms and transfer functions)
- Normalization of permeate quality, RO system operation parameters and check points
- Shutdown & preservation
- What to monitor, what should be the KPI or leading indicators for to understand the performance of RO
- Membrane Cleaning and Troubleshooting

Training Methodology

This training seminar will be conducted along workshop principles with formal lectures and interactive examples, which will result in the active participation of all delegates. There will be ample opportunities for active, open discussions and sharing professional experiences on various industrial applications.

Objectives

By the end of this training seminar, the participants will be able to:

1. Know the best start-up and shutdown procedures
2. Identify cause premature failure of RO membranes
3. Identify cause of RO fouling and implement best cleaning practices
4. calculate the normalized data through long algorithms and transfer functions
5. Inform the right time for cleaning days before he is going to schedule

Organizational Impact

1. Membrane failures will significantly reduced if the operation is streamlined as per best practices
2. Cleaning frequency shall reduce and O&M Cost of RO operation shall reduce.
3. Understanding of process and can be converted to process driven rather than expert driven system.
4. On completion of this seminar the delegates will be able to analyze the various dynamics of RO Fouling & Failures and will be able to suggest corrective and preventive action to avoid costly downtime and improve life of membrane element.

The knowledge gained in this seminar will:

1. Improve the way the RO operation/cleaning is done
2. Correlation with the Feed water quality and improvement in RO feed
3. Give the delegates skill to analyze the type of membrane fouling and take corrective/preventive action
4. Give better insight to the increase life of Membranes
5. Avoid downtime of production due to RO plant shutdown

Personal Impact

1. Improved confidence when solving problems of RO plant
2. Better understanding of what is impacting these failures
3. Better knowledge of monitoring methodologies
4. Improved personal skills of taking proactive action
5. Better ability to troubleshoot difficult situations

Who Should Attend?

This training seminar is suitable to a wide range of professionals but will greatly benefit:

1. Operation, technical production & service professionals
2. Technical professionals responsible for maintenance and repair of equipment, Mechanical maintenance of IPP and CPP
3. Professionals involved in inspection and reliability
4. Technical professionals dealing with risk assessment and integrity analysis
5. Technicians dealing with regulating and metering and other measurements
6. Water Chemistry / Power Plant Chemistry professionals

Agenda

Day 1

- Introduction
 - Initial start-up checks
 - Shimming procedure
- Removal of elements
- Start-up check lists for RO system operation
 - Checks before commissioning
 - Regular start-up checks in daily operation
- Operation monitoring methods for RO system
 - Monitoring
 - Regular monitoring and check points
 - Logbook
 - Normalization of permeate quality
 - Normalization of permeate flow rate
 - Sample calculation
- Variations of operation data from nominal value
- RO system operation parameters and check points
- Shutdown considerations for RO system
 - Short term shutdown
 - Long term shutdown
- Preservation and cleaning Periods
- General instructions and conditions for RO cleaning
- Guidelines for RO cleaning
 - When to clean:
 - Determination of foulants
 - Selection of cleaning procedure
 - Evaluation of the effectiveness of cleaning

Day 2

- Flushing procedures without chemicals
- Instructions for chemical cleaning
 - General guidelines
 - Dimensioning a cleaning system
- Citric acid cleaning procedure
 - Pre-flushing of elements
 - Preparation of solution
 - Circulation of cleaning solution
 - Flushing of elements
 - General description of a citric acid
- Alkaline solution and Dodecyl Sodium Sulfate (DSS) detergent cleaning procedure, Pre-flushing of elements, Preparation of solution, Circulation of cleaning solution & Flushing of elements
- Sterilization methods for RO/NF – elements
- Sanitizing of RO – elements (TS-types)
- Membrane treatment procedure
- Storage and preservation
 - Storage of new elements
 - Storage/preservation of used elements
- Handling of new elements
 - Precautions which should be taken during storage
 - General notes for installation into pressure vessels
- Troubleshooting
- Typical performance changes and countermeasures
 - Normalized permeate flow rate (NPFR) decline – first bank
 - Normalized permeate flow rate (NPFR) decline – last bank
 - Normalized salt passage (NSP) increase – almost all vessels
 - Normalized permeate flow rate (NPFR) decline – all banks
 - Differential pressure (DP) increase
 - Normalized salt passage (NSP) increase – partial vessel

Expert Profile Mr. S Banerjee – Mr. S Banerjee is a seasoned power plant Chemistry and water treatment professional with in-hand experience of 25+ yrs after passing M.Sc. Applied Chemistry from Government Engineering College, Jabalpur in 1995. He has worked with India's Pioneer Water Treatment Company and with Giant Private Power Generators in India viz. Tata Power, Adani Power, Jindal Power, LPGCL as HOD Power Station Chemistry and Environment. He has both experiences of sub critical and super critical power plants, commissioning-O&M and troubleshooting of water treatment plants, boiler water, cooling water, stator water and waste water. He was also associated with a reputed Institute of Power Technology as a faculty on Water treatment and Power Plant Chemistry. He has presented many papers on water treatment, power plant chemistry and water management in national seminars and magazines and also **written a book "Practical Guide to Thermal Power Station Chemistry"**.

Few topics of Published Papers in International forums:

1. Reaching High COC in cooling water system to save water, energy and chemicals,
2. Flow Accelerated Corrosion and its prevention (emphasizing Oxygenated Treatment) and monitoring,
3. Monitoring of heat transfer in cooling water systems.
4. Significance of water and steam purity in Thermal Power Plant
5. Advanced Method to optimize RO membrane performance
6. Proactive Lead Fouling Indicator for all types of membranes
7. Using sensor data analytics – predictive modeling for improved effectiveness in Thermal Power Stations
8. Developing Organization Strategic Intents to Achieve Business Excellence through Hoshin Kanri Concept
9. Tracking, Tracing and Theft Evading: New Technologies Of Governance And The Mining Logistics Industries – Mining Industry