

**Just-Chemicals.com Presents 2 days Highly Interactive workshop on  
“Power Plant Chemistry Dynamics and its effect on Boiler and Turbine”**

**(Includes RO Operations, Boiler Water Treatment, Cooling Water Treatment and Coal sampling & Analysis)**

**Introduction**

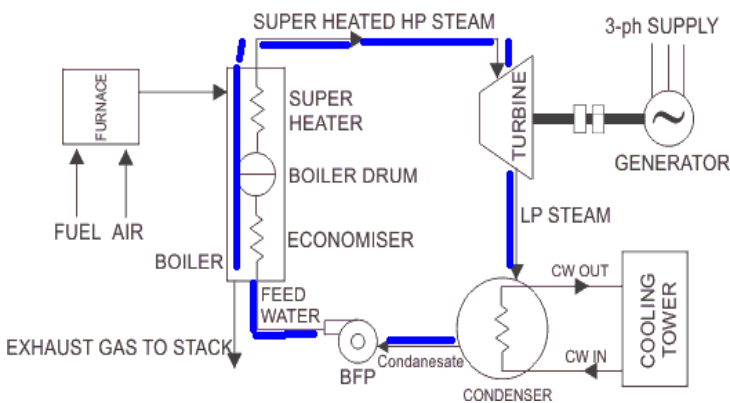
Coal is the major input for any thermal power plant while Water and steam are the lifeblood of any steam-driven power facility, and proper power plant chemistry control is critically important to plant operation, reliability, the bottom line, and Environment.

Many thousands of industrial plants around the world generate high-pressure steam for process applications and power generation. Yet, water/steam monitoring and control often take a back seat to process operations, even though corrosion, scaling and other problems caused by poor water/steam chemistry can cost a plant crore(s) of rupees. Plant operators, engineers and technical personnel should be alert to critical issues regarding water/steam quality during steam generation.

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.

Evaporative cooling towers are very popular as they provide the most cost effective cooling technology for condenser cooling, commercial air conditioning and industrial processes. In spite of these concerns, treatment and control of cooling tower water is commonly neglected, which is then responsible for substantial problems due to downtime, equipment damage, loss of process control, high water use, environmental violations, safety hazards, and increased energy usage.

This training is intended to provide the Power plant operational and Power plant chemistry staff with an advanced knowledge of cooling water management so that problems resulting from corrosion, scale, deposition, and biological fouling, RO fouling, DM Plant troubles and coal GCV imbalance can be avoided. Reduction of operating costs from increased efficiency in use of energy will be discussed.



**The training seminar will feature:**

- Water Chemistry understanding
- Effect of various parameters especially DO and pH
- Understanding the propensity of corrosion
- Corrosion mechanism in boiler and CW
- Effect on fuel consumption in Boilers due to blowdown/poor water chemistry control
- What to monitor, what should be the KPI or leading indicators for to understand effectiveness of RO, Cooling & boiler water chemistry
- Coal sampling and analysis

**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**

To provide understanding and knowledge to the Operation Engineers and Power Plant chemistry personnel on various techniques of chemical controls and their effect on-plant performance and failure. The program will help the Operation Engineers in day-to-day for decision making and also in emergencies.

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

1. Identify and understand the importance of chemistry parameters in RO operation, Cooling Water, Steam-water cycle and Coal sampling and analysis
2. Understand the cost-effectiveness of Preventive Maintenance program through chemistry applications
3. Apply techniques of optimisation of fuel by reducing blowdown through proper steam-water cycle chemistry control and maintaining CW or air-cooled condenser AHU clean
4. Make the important decision on the basis of the chemistry parameters
5. Create monitoring systems with trending to assess the chemistry controls and excursions

**Organizational Impact**

On completion of this seminar the delegates will be able to analyze the operation and maintenance of various dynamics within the RO Plant Operation/cooling water system/steam water cycle chemistry and suggest potential improvement in saving fuel, water and most importantly life of Boiler/HRSG. This training should improve the process control of power plant Chemistry and monitoring methodology. Those who think they do not have any problem, will identify what mistake they may be doing.

**The knowledge gained in this seminar will:**

1. Enable the delegates to optimize the fuel consumptions in Boiler.
2. Reduction in boiler tube failures due to water chemistry
3. Give the delegates skill to analyze effectiveness of power plant chemistry
4. Maintain Good Heat transfer rates while reducing corrosion
5. Reduce Corrosion/deposition water cycles
6. Give better insight to the increase life of Boilers
7. Avoid downtime of production due to corrosion of power plant equipments

**Personal Impact**

1. Improved confidence when solving problems of Power Plant Chemistry
2. Better understanding of how optimized the different water treatment
3. Better knowledge of corrosion mechanism
4. Improved personal skills of taking proactive action on cycle chemistry
5. Better ability to troubleshoot difficult situations in Boilers, Cooling Tower, RO or Coal chemistry-combustion

**Who Should Attend?**

This training is addressed to all employees from the fields of **chemistry, mechanical and operation engineering**, who are in charge in the operation, planning or servicing of power plants. The training aims to explain the elementary chemical background as well as to sensitize the participants on possible causes of errors during operation of water treatment plants.

## 2 day agenda

### Day 1

#### 1<sup>st</sup> Half (Boiler Steam Water cycle Chemistry)

- Water Chemistry of steam-water cycle
- International Guidelines
- Significance of parameters in steam-water cycle
- Corrosion of metal
- Water analysis – Requirement
- Formation of a protective layer
- Transportation of corrosion products and deposits
- Steam impurities
- Chemical conditioning of water-steam cycle
- Significance of the standard values and their analytical monitoring
- Chemical program selection
- Minimize blowdown

#### 2<sup>nd</sup> Half (cooling Water treatment and heat transfer monitoring)

- Cooling Water Systems
- Measuring Performance (scale, corrosion & Fouling)
- Relationship between Makeup, Blowdown, Evaporation and Drift
- Relationship Between Cycles of Concentration and Makeup Demand
- Water Treatment Requirements & Chemicals
- Monitoring Your System & System Concerns
- Stability indices calculator
- Heat Transfer monitoring of heat exchangers

### Day 2

#### 1<sup>st</sup> half (RO Plant Operation and Cleaning Best Practices)

- Introduction
- Initial start-up checks
- Start-up check lists for RO system operation
- Operation monitoring methods for RO system
- Monitoring
- Regular monitoring and check points
- Normalization of quality and Flow
- Sample calculation
- Variations of operation data from nominal value
- RO system operation parameters and check points
- Shutdown considerations for RO system
- Preservation and cleaning Periods
- General instructions and conditions for RO cleaning
- Guidelines for RO cleaning and When to Clean
- Determination of foulants & selection of cleaning agent
- Evaluation of the effectiveness of cleaning

#### 2<sup>nd</sup> Half Coal Sampling and Analysis

- Coal types,
- Coal sampling and comparison between IS, ASTM and ISO,
- Coal analysis,
- Experience with imported coal
- Coal combustion calculations in details
- Flue gas composition calculation
- Burning of coal in Boiler

### Terms and Definitions

**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