WE010:
Water Treatment for Plant Utilities, Offsite & Cogeneration
Training Description:

Plant utilities or offsite are a vital service to the operation of most major industrial plants. Unfortunately, they are usually ignored until they cause problems and then it can be too late. The plant will suffer a major derating or outage that could have been avoided. This course is a must for the key personnel at any plant that relies upon reliable cooling water and steam production. This would include:

- Petrochemical, including refineries and gas separation
- Coal-fired, gas fired and combined cycle electrical generation
- Plant utilities for a wide variety of production facilities including pulp and paper, food processing, iron and steel, etc.
- Manufacturers of boilers, cooling towers and heat exchangers

Training Objective:

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

✓ Apply and gain an in-depth knowledge on water treatment for plant utilities, offsite and cogeneration
✓ Determine the importance, role and use of alkalinity in water treatment and as well as the features of dissolved oxygen
✓ Carryout external treatment for boiler applications and review & employ reverse osmosis (RO) membrane desalination to plant utilities, offsite & cogeneration
✓ Recognize the role & application of Reverse Osmosis (RO) technology and design of reverse osmosis systems
✓ Describe the step-by-step process and perform monitoring of internal treatment operation
✓ Enumerate cooling water treatment program requirements and determine the three critical points to consider the operation of any cooling system
✓ Discuss cooling system designs and emphasize the role of water treatment
✓ Identify the parts of the selected cooling systems including its features & functions
✓ Conduct performance monitoring and improve in-service cleaning including chemical & mechanical methods for both off-line on-line cleaning

Training Designed for:

This course is intended for all water treatment and Boiler Plant Supervisors and Operators, Designers Responsible for Plant Utilities; Energy Conservation and Environmental Engineers; Managers and Operators for Industrial Processes using steam and/or cooling water; Managers and Operators of combined cycle generating plants; technical representatives for chemical treatment and service companies; technical representatives for companies involved in the manufacture or sales of boilers, heat exchangers, cooling towers and related instruments.
Training Program:

**DAY ONE:**
PRE-TEST
¥ Introduction
¥ **WHY IS A BOILER-WATER TREATMENT PROGRAM REQUIRED?**
  ➢ There are three critical points to consider in the operation of any boiler plant: Corrosion removes metal from heat-exchange surfaces. There is no mechanism to put it back. When there is no longer sufficient wall thickness, the component will fail and in the process, operating staff can be injured or killed and production can be brought to an abrupt stop. Deposition on heat-exchange surfaces prevents the heat from going where it should. That loss of heat transfer results in higher production costs and once the margin of reserve is gone, production will be limited. There is an inherent sampling problem in all systems. It is not possible to take a sample from the region where active corrosion or deposition could be occurring. Is it possible to take meaningful data?

• **BOILER DESIGN AND THE ROLE OF WATER TREATMENT**
  o The various classes of boilers and their special needs
  o The boiler as a concentrating mechanism
  o Guidelines and needs for different pressures
  o **WORKSHOP ON BOILER MASS-BALANCE CALCULATIONS**
  o How to finalize simple routine analyses to find water losses?

• **REFRESHMENTS AND NETWORKING ALKALINITY**
  o Why do we need alkalinity control and how do we apply it?
  o Coping with the mixed metallurgy that minimized the original capital cost

**DAY TWO:**

¥ **DISSOLVED OXYGEN**
  • Oxygen is the food for corroding carbon steel
  • Mechanical versus chemical methods for removing dissolved oxygen
  • Oxygenating chemistry: is it a contradiction or a better way?

¥ **INTERNAL VERSUS EXTERNAL TREATMENT**
  • How to keep the boiler clean. Do we utilize hardware or chemicals?

¥ **WORKSHOP ON CALCULATING ENERGY LOST THROUGH BLOWDOWN**
  • How to calculate the energy lost through blowdown? How do you reduce it?

**DAY THREE:**

¥ **OPTIMIZING THE CHEMICAL TREATMENT PROGRAM**
  • Performing a mass balance
  • Improved phosphate programs to avoid hideout
  • Monitoring the operation
  • Start-up, shutdown and transient conditions
  • Carryover with steam
WHY IS COOLING-WATER TREATMENT PROGRAM REQUIRED?

- There are three critical points to consider in the operation of any cooling system:
  - Corrosion removes metal from heat-exchange surfaces. There is no mechanism to put it back. When there is no longer sufficient wall thickness, the component will fail and in the process, production can be brought to an abrupt stop.
  - Deposition of heat-exchange surfaces prevents the heat from going where it should. That loss of heat transfer results in higher production costs and once the margin of reserve is gone, production will be limited.
  - There is an inherent sampling problem in all systems. It is not possible to take a sample from the region where active corrosion or deposition could be occurring. Is it possible to take meaningful data?

DAY FOUR:

- COOLING SYSTEM DESIGNS AND THE ROLE OF WATER TREATMENT
  - Contact and non-contact cleaning
  - Once-through cleaning
  - Recirculating or cooling tower systems
  - Closed loop recirculating systems

- REFRESHMENTS AND NETWORKING WORKSHOP ON COOLING SYSTEM CALCULATIONS
  - How to calculate chemical consumption and water usage

- SELECTED COOLING SYSTEMS
  - HVAC systems
  - Major industrial systems
    - high and low heat load systems
    - direct contact with process fluids
    - closed loops for critical systems
  - Electrical generation

DAY FIVE:

- REFRESHMENTS AND NETWORKING PERFORMANCE MONITORING
  - Use of alternative plant equipment and test sections
  - Commercial monitoring instruments

- WORKSHOP ON MONITORING HEAT-EXCHANGER CLEANLINESS
  - Can we assess the cleanliness of a steam condenser or HVAC chiller without having to shut down and open them up?

- IN-SERVICE CLEANING
  - Off-line procedures
    - chemical cleaning
    - mechanical procedures
  - On-line procedures
    - chemical cleaning

- Mechanical properties

- Course Conclusion

POST-TEST and EVALUATION
Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures, Concepts, Role Play
- 30% Workshops & Work Presentations, Techniques
- 20% Based on Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00  Morning Coffee / Tea
08:00 - 10:00  First Session
10:00 - 10:20  Recess (Coffee/Tea/Snacks)
10:20 - 12:20  Second Session
12:20 - 13:30  Recess (Prayer Break & Lunch)
13:30 - 15:00  Last Session

For training registrations or in-house enquiries, please contact:
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