

# Boiler and HRSG Design and Operation Fundamentals

This two-day course is primarily intended for O&M staff at all levels of experience working in thermal power plants with conventional boilers or combined cycle (CCGT) units but is also useful for engineers and managers involved in new project development or modifications to existing plants. It delivers attendees a comprehensive yet in-depth survey of a broad range of topics relating to the design, operation and maintenance of radiant boilers and HRSGs and certain directly associated steam-cycle systems such as power piping.

Drawing on Tetra Engineering's extensive field experience working at hundreds of thermal power plants throughout the world, participants are given clear instruction on the design features and operating issues that can impact boiler and HRSG reliability, efficiency and operating life.

## Course Syllabus

### **Introduction**

- Comparison of Different Boilers & Cycles
- HRSGs & Combined-Cycle Power Plants
- Radiant Boilers and Conventional Thermal Power Plants

### **Boiler and HRSG Design Basics**

- Thermodynamics & Heat Transfer
- Natural and Forced Circulation
- Materials Used in Boiler Construction

### **Design Variants**

- HRSGs
- Radiant Boilers

### **Flow Path Descriptions**

- Waterside Flow Paths
- Gas Side Flow Paths

### **Pressure Parts**

- Preheaters & Economizers
- Evaporators
- Superheaters, Reheaters
- Drum and Deaerators
- Drains, Vents

### **Associated Steam Cycle Components**

- Attemperators, Key Valves
- Pipe Supports and Boiler Piping

### **Combustion and Exhaust Systems**

- Fuels
- Furnace Burners
- HRSG Supplementary Firing
- Air and Exhaust Process Components
- Emissions Controls

### **Control and Instrumentation**

- Burners
- Drum Level
- Steam Pressure and Temperature
- Attemperators
- Emissions Control Systems

### **Boiler and HRSG Life Reduction**

- Corrosion & Damage Mechanisms
- Impact of Operating Regime

### **Operations and Maintenance**

- Standard Maintenance Activities
- Water Chemistry Control
- Boiler Preservation
- Inspection Practice
- Life and Performance Monitoring
- Major Repairs

### **Case Histories**

- Inspections
- Failure Analyses
- Repair