Boiler Systems

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This three-day course provides a strong introduction to the operation and design theory surrounding boilers and boiler control systems. Students leave the classroom with an in-depth knowledge of boiler systems, including topics such as combustion theory, fuel quality, air pollution control, and boiler operation. This course maintains a steady focus on the environmental concerns surrounding the operation and maintenance of boilers, including a thorough discussion of governmental laws and guidelines that pertain to this area.

I. Air Pollution Fundamentals

- Fuel Dependant Air Pollutants
- Combustion Dependant Air Pollutants
- Smoke and Particulate
- Steam Generators
- Laws and Regulations
- Regulatory Requirements

II. Boiler Fundamentals

- Boiler Fundamentals
- Package Boilers
- Combustion Process
- Fans
- Fuel Supply Systems
- Burner Arrangements - Natural Gas Burners
- Oil Fired Boilers
- Atomization
- Operation
- Burner Arrangements
- Boiler Design Parameters

III. Fossil Fuels

- Natural Gas
- Fuel Oil
- Liquid Fuel Characterization
- Fuel Oil Properties

IV. Combustion Principles

- Basic Combustion Reactions
- Products of Combustion
- Incomplete Combustion
- Undesirable Products of Combustion

V. Normal Operation

- Maintaining Suitable Combustion Conditions
- Monitoring Combustion
- Combustion Fuel
- Maintaining Steam Temperature and Pressure
- Controlling the Steam Temperature
- Startup Procedures
- Shutdown Procedures

VI. Automatic Control Systems

- Automatic Analog Control System Elements
- Automatic Combustion Control Systems

VII. Continuous Emission Monitoring

- General Classification of CEM□s
- Components of CEM□s
- Usage of CEM□s in Utility/Industrial Boilers
- Sulfur Oxides
- Nitrogen Oxides Control Overview
- Control of NOx Emissions