

# Heat Rate: Optimizing Your Power Plant

## Heat Rate & Plant Efficiency

This three day course covers the fundamentals of heat rate and the impact of changing heat rate on operating cost. The course includes an overview of heat rate concepts, controllable and non-controllable losses, and the effects of component performance on operating cost.

### I. Heat Rate Basics

- What is Heat Rate?
- Plant Heat Rate
- Conversion Factors for Standard Cubic Foot (scf) to Pounds Mass (lbm)
- Why is Heat Rate Important?
- Heat Rate Deviation
- Cost of Heat Rate Deviations

### II. Gas Turbine

- Gas Turbine Theory
- Gas Turbine Components
- Air Inlet Equipment
- Compressor
- Combustion Section
- Turbine Section

### III. Steam and Feed System

- Thermodynamics
- First Law of Thermodynamics
- Second Law of Thermodynamics
- Heat and Temperature
- Heat and Work
- Cooling Towers

### IV. Boiler

- Boiler Efficiency
- Boiler Degradation
- Fuel Issues
- Environmental Concerns
- Maximizing Boiler Efficiency

### V. Heat Recovery Steam Generator

- HRSG Cycling
- HRSG Thermodynamics
- HRSG Design
- Steam Generation
- Duct Burners
- Stack Temperature
- Selective Catalytic Reduction (SCR)

### VI. Steam Turbine

- Steam Turbine Types
- Turbine Efficiency
- Turbine Cycle Heat Rate
- Steam Turbine Degradation
- Controlling Turbine Efficiency

### VII. Miscellaneous Major Equipment

- Feedwater Heater
- Condenser
- Cooling Tower (Heat Rejection)
- Miscellaneous Equipment
- Optimizing Heat Rate and Efficiency