

## Combined-Cycle Plant Maintenance and Operations

This five-day course begins with a review of gas turbine theory. Next, the main turbine systems are described, including air inlet and filtration, compressor, combustion system, turbine section, bearings, support systems, protection systems, HRSG, duct burner, and SCR system. Water chemistry as it relates to turbine operations is discussed. Plant operations and turbine control processes are also described. The final portion of the course describes combined-cycle plant maintenance and inspections.

### I. Gas Turbine Theory

- Basic Gas Turbine Cycle
- Gas Path
- Gas Turbine Design
- Major Components

### II. Air Inlet and Filtration Systems

- Air Inlet System
- Inlet Compartment
- Air Filtration System
- Power Augmentation

### III. Compressor Section

- Compressor
- Compressor Cleaning

### IV. Combustion System

- Emissions
- Components

### V. Turbine Section

- Turbine Rotor
- Cooling
- Nozzles
- Diaphragm
- Shrouds
- Exhaust Frame

### VI. Bearings

- Tilting Pad Journal Bearings
- Thrust Bearing
- Lubrication
- Lubricant Sealing

### VII. Support Systems

- Ignition System
- Lube Oil System
- Gas Fuel Control System
- Generator
- Starting System
- Control System

### VIII. Protection Systems

- Over Speed Protection
- Over Temperature Protection
- Flame Detection and Protection System
- Vibration Protection
- Combustion Monitoring

### IX. Heat Recovery Steam Generator

- HRSG Design Basics
- HRSG System Description
- HRSG Components
- HRSG Systems

## **X. Duct Burner System**

- System Description
- Burner System
- Operation

- Inspection Technology for HRSGs
- Inspection Types

## **XI. Selective Catalytic Reduction System**

- System Description
- System Components
- System Operation
- SCR System Control

## **XII. Water Chemistry**

- Water Treatment
- Water Treatment Problems
- Blowdown

## **XIII. Plant Operations and Controls**

- Control Panels and Definitions
- Motor Control Center
- Supervisory Remote Equipment
- Annunciator System
- Gas Turbine Operator Commands
- Governor Commands

## **XIV. HSRG Operation**

- Startup
- Combined Cycle Plant Startup
- Removing HRSG From Service
- Cyclic Operations of HRSG
- Shutdown - Combustion Turbine Trip
- Flexible Operation of Combined Cycle Gas Turbine

## **XV. Combined Cycle Plant Maintenance and Inspections**

- Maintenance
- Maintenance System
- Turbine Routine Maintenance
- HRSG Routine Maintenance