This five-day overview course describes the portion of the sub-systems that support the plant gas turbine operation. This is a technician-level course for both operating and maintenance personnel, providing the knowledge base necessary to begin working on equipment.

I. Steam Basics
   A. Thermodynamic Fundamentals
   B. Non-Flow Processes
   C. Liquid-Vapor Systems
   D. Heat Engines
   E. Turbines
   F. Steam Power

II. Boiler Fundamentals
   A. Boiler Fundamentals
   B. Package Boilers
   C. Combustion Process
   D. Fans
   E. Fuel Supply Systems
   F. Burner Arrangements: Natural Gas Burners
   G. Oil-Fired Boilers
   H. Atomization
   I. Operation
   J. Burner Arrangements

III. Simple and Combined Cycle Overview
   A. Energy in a Simple Cycle Power Station
   B. Gas Turbine Cycle
   C. Plant Operator's Responsibilities
   D. Plant Safety
   E. Environmental Aspects
   F. Power Station Types and Comparisons
   G. Power Demand Growth
   H. Transmission System
   I. Simple Cycle Gas Turbine Plant
   J. Combined Cycle Gas Turbine Plant
   K. Major Systems and Components

IV. Heat Recovery Steam Generator (HSRG) System
   A. Flowpath Descriptions
   B. Major Equipment

V. Fossil Fuels
   A. Natural Gas
   B. Fuel Oil
   C. Liquid Fuel Characterization
   D. Fuel Oil Properties

VI. Combustion Principles
   A. Basic Combustion Reactions
   B. Products of Combustion
   C. Incomplete Combustion
   D. Undesirable Products of Combustion

VII. Air Pollution Fundamentals
   A. Fuel Dependant Air Pollutants
   B. Combustion Dependant Air Pollutants
   C. Smoke and Particulate
   D. Steam Generators
   E. Laws and Regulations
   F. Regulatory Requirements

VIII. Continuous Emission Monitoring
   A. General Classification of CEM's
   B. Components of CEM's
   C. Usage of CEM's in Utility/Industrial Boilers
   D. Sulfur Oxides
   E. Nitrogen Oxides Control Overview
   F. Control of NOx Emissions

IX. Normal Operation
   A. Maintaining Suitable Combustion Conditions
   B. Monitoring Combustion
   C. Combustion Fuel
   D. Maintaining Steam Temperature and Pressure
   E. Controlling the Steam Temperature
   F. Startup Procedures
   G. Shutdown Procedures
Fossil Power Generation

X. Automatic Control Systems
   A. Automatic Analog Control System Elements
   B. Automatic Combustion Control Systems

XI. Efficiency
   A. Why Do Inefficiencies Occur?
   B. Size of Losses in a Steam System
   C. Cost of Steam
   D. Identifying Savings
   E. Definition of the Processes
   F. Steam Distribution
   G. Condensate Heat Recovery
   H. Steam Generation
   I. Measuring Performance

XII. Igniters
   A. Fuels and Fuel Characteristics
   B. Combustion
   C. Basic and Ideal Combustion
   D. Components of a Burner Port
   E. Factors Affecting Combustion
   F. Flame Characteristics

XIII. Typical Systems
   A. Fuel Oil System
   B. Pulverized Coal Burning
   C. Equipment
   D. Lighters
   E. Dual Register Burners
   F. Flame Detectors
   G. Lighter Control System
   H. Lighter Control Logic Sequence

XIV. Control
   A. Air Flow
   B. Fuel Flow
   C. Functional Description
   D. Control System Operating Modes
   E. Unit Description
   F. Purge
   G. Furnace Firing Permissives
   H. Pulverizer Group Start Sequence
   I. Maintained Lighters
   J. Pulverizer Group Operation
   K. Pulverizer Group Stop Sequence
   L. Inert and Clearing System
   M. Pulverizer Group Trips
   N. Pulverizer Group Sequence Permissives

XV. Furnace Explosions
   A. Conditions
   B. Reasons
   C. Results
   D. Case Studies

XVI. Balance of Plant Overview
   A. Auxiliary Steam System
   B. HRSG Blowdown System
   C. Circulating Water System
   D. Closed Cycle Cooling Water System
   E. Compressed Air System
   F. Compressed Gases System
   G. Condensate System
   H. Demineralized Water System
   I. Feed Water System
   J. Fire Protection System
   K. Plant Drains System
   L. Potable Water System
   M. Service Water System
   N. HP, HRH, CRH, and LP Steam Systems
   O. Condenser Air Removal System

XVII. Generator and Generator Excitation Overview
   A. Generator Theory
   B. Generator Construction

XVIII. Measurement and Testing Equipment
   A. Basic Measurement Instrumentation
   B. Basic Control Loop
   C. Control Instrumentation
   D. Testing Practices
   E. Test Equipment
   F. Results and Documentation

XIX. Environmental Awareness